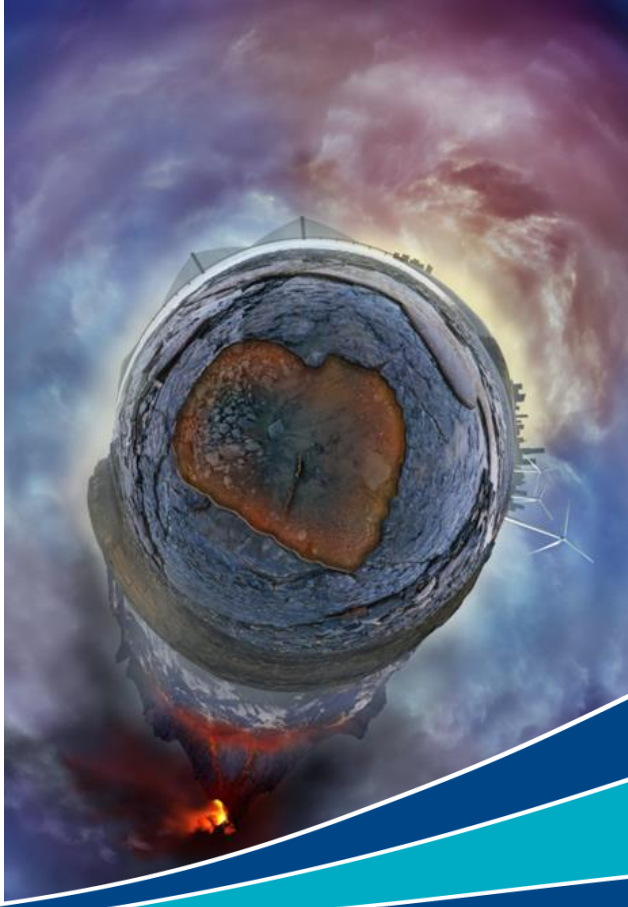
International perspectives on integration of geotechnical risk management and project risk management



EurGeol Paul C Maliphant BSc MSc CGeol FGS FICE

UK Registered Ground Engineering Advisor

Mott MacDonald

To look forward to ……

- ISSMGE TC304-TF3
- International state of the art
- Interim conclusions
- UK perspectives
- Discussion – where do we go from here?

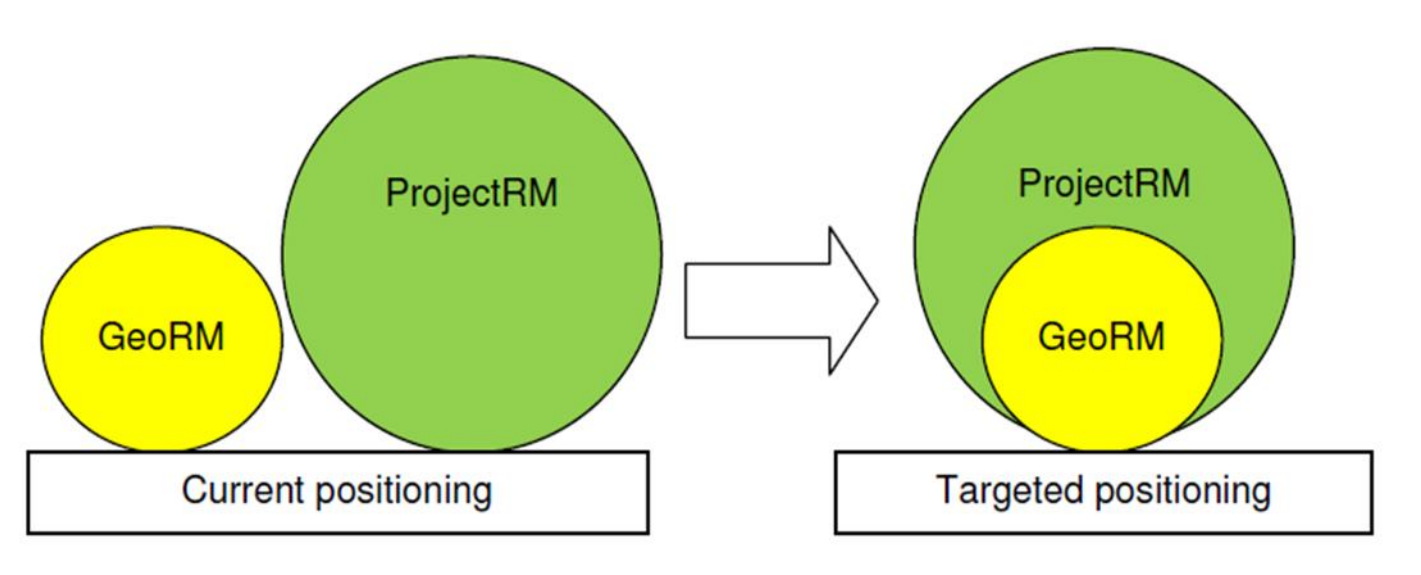
Mott MacDonald

ISSMGE TC304-TF3

- International Society of Soil Mechanics and Geotechnical Engineering
- Technical Committee: TC304 Engineering Practice of Risk Assessment & Management
  - Focus: Impact on society
- Task Force: TF3 Coordination with broader risk community
  - Objective: Contributing to the integration of GeoRM in ProjectRM by sharing and evaluating existing international knowledge and lessons.

Mott MacDonald

TF3 Hypothesis



How to integrate geotechnical risk management in project risk management, for successful and cost-efficient management of engineering and construction risk

Mott MacDonald

TF3 Consultation and Publication

- Austria
- China
- Czech Republic
- Finland
- Germany
- Japan
- Netherlands
- Sweden
- Switzerland
- United Kingdom.

Publication of International state of the art report was at the 4th International Symposium on Geotechnical Safety and Risks, December 4-6, 2013, Hong Kong

Mott MacDonald

- Recommendations that are primarily realized by changes in the organization structure of (project) organizations (Os) involved in construction projects
- Those primarily realized by changing the culture within these organizations (Oc)
- Recommendations primarily involving technical measures (T)

Mott MacDonald

Value – project risk management

No.	Results of applying ProjectRM	Countries	Percentage
1	Reduction of probability of failure and minimizing failure costs against an acceptable risk profile	Austria, China, Czech Republic, Germany, Japan, Netherlands, United Kingdom (7)	70 %
2	Communication improves amongst participants during the construction and prevents potential conflicts.	Austria, Czech Republic, Germany, Switzerland, United Kingdom (5)	50 %
3	Increasing the acceptability of the project amongst the public.	Austria, Germany, Japan, Switzerland (4)	40 %

Top 3 hurdles to delivering this value

No.	Type	Hurdles for applying ProjectRM	Countries	In %
1	Os	It takes time, costs, additional paperwork, creates bureaucracy and apathy, while the benefits (RoI) is not always easy to proof.	China, Czech Republic, Finland, Netherlands, Sweden, UK, (6)	60 %
2	Oc	A tendency to hide risks and problems, instead of communicating them with other parties. Risks are not admitted, accepted, and communicated by (public) clients.	Austria, China, Czech Republic Germany, Switzerland, UK (6)	60 %
3	Oc	Risk-averse culture, which puts high value on safety and certainty; does not allow admitting potential risks.	Austria, Germany, Japan, Switzerland, United Kingdom (5)	50 %

Top 3 solutions to overcome the hurdles

No.	Type	Solutions for overcoming ProjectRM hurdles	Countries	In %
1	Os	Parties participating in the construction projects should become educated in ProjectRM and its benefits.	Austria, Czech Republic, Germany, Japan, Switzer-land, United Kingdom, Sweden (7)	70 %
2	Oc	Public clients should accept and require ProjectRM explicitly, for instance as part of the Best Value Procurement.	Austria, Czech Republic, Netherlands, Germany, Japan, Switzerland (6)	60 %
3	Oc	Improvement of open risk communication, based on trust amongst the participants.	Austria, Czech Republic, Germany, Japan, Switzer-land, United Kingdom (6)	60 %

Value – geotechnical risk management

No.	Results of applying GeoRM	Countries	Percentage
1	Avoiding cost and time overrun for clients and contractors, minimizing geotechnical risk to construction staff, maintenance staff and the public	Austria, China, Germany, Japan, Netherlands, United Kingdom, Switzerland (7)	70 %
2	Management of identified risks to ensure sustainable and safe design and construction.	Austria, Germany, Switzerland, United Kingdom (4)	40 %
3	Reduction of conflicts, contractual issues and claims	Austria, Germany, Switzer-land, United Kingdom (4)	40 %

Top 3 hurdles to delivering this value

No.	Type	Hurdles for applying GeoRM	Countries	In %
1	Os	The probable additional time & cost to clients, contractors, and geotechnical specialists, without having a clear return on investment (RoI).	Austria, China, Czech Republic, Finland, Germany, Netherlands, United Kingdom, Switzerland (8)	80 %
2	Oc	Lack of recognition of georisks by clients, structural engineers, project managers, and architects. Not all parties are willing to talk and understand each other's points of view on risk and cost.	Austria, Czech Republic, Germany, Japan, Nether-lands, Switzerland, United Kingdom, Sweden (8)	80 %
3	Oc	The importance of planning and design works is often underestimated, resulting in underfinancing of preparation, planning and design works, incl. number and quality of site investigation.	Austria, China, Czech Republic, Germany, Japan, Switzerland, United Kingdom (7)	70 %

Top 3 solutions to overcome the hurdles

No.	Type	Solutions for overcoming GeoRM hurdles	Countries	In %
1	Os	Education of clients in GeoRM benefits, non geoprofessionals, who have to manage geo components or schemes, and geoprofessionals.	Austria, China, Czech Republic, Germany, Japan, Switzerland, UK, Sweden (8)	80 %
2	Os	More emphasis on GeoRM in project planning & preparation, including alternatives & options, decision making by objective risk analysis.	Austria, Czech Republic, Germany, Japan, Switzer-land, United Kingdom (6)	60 %
3	Oc	Promotion of risk management supported by GeoRM cases, successes & lessons learned	China, Netherlands, United Kingdom, Sweden (5)	50 %

How does GeoRM contribute to ProjectRM?

No.	Contribution of GeoRM to ProjectRM
1	GeoRM plays a crucial role in ProjectRM, as geotechnical uncertainties have major influence on construction projects. Compared to other construction materials, ground is extremely heterogeneous.
2	Managing geotechnical risks helps to increase the safety of the works and of the final constructions as it allows identifying potential hazards.
3	Systematic gathering of geotechnical information along with other information (e.g. construction performance and construction cost) would help to improve the know-how and to learn from past projects.

What is the status of GeoRM - Project RM integration?

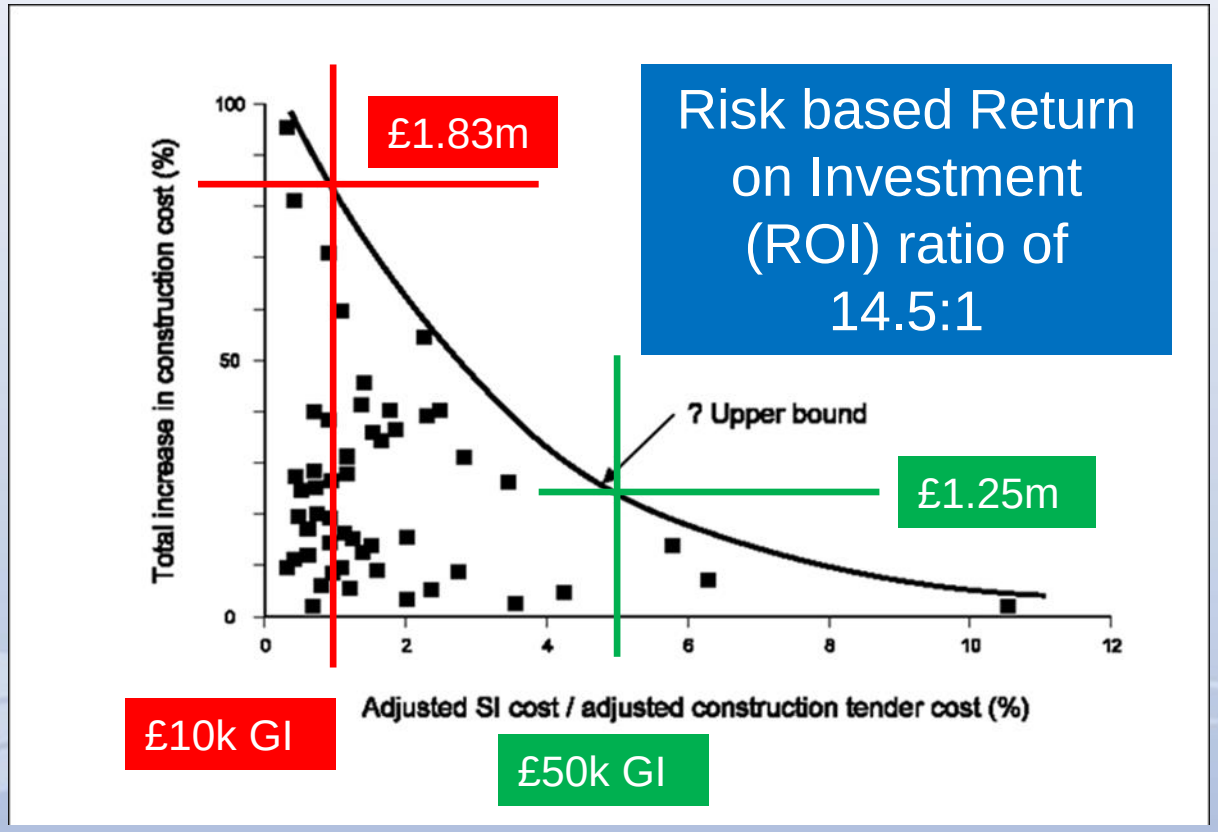
Country	Status of GeoRM – Project RM integration
United Kingdom	Varies within the spectrum full integration – partial integration (often poor and ad hoc) – no integration – no risk management. Full integration by published procedure does not ensure full integration by process implementation.

Interim conclusions

- Geotechnical Risk Management **MUST** be considered an integral part of Project Risk Management
- All construction projects should incorporate **BOTH** Geotechnical Risk Management and Project Risk Management
- **Neither** of the above statements are universally applied
- Most of the problems are **organisational not technical**
- **The current situation costs**
- **The above is not news!**

Mott MacDonald

1994



Ref: Mott MacDonald Soil Mechanics 1994

Mott MacDonald

Ground Investigation – you always pay!

On Projects you will always pay for a thorough ground investigation...

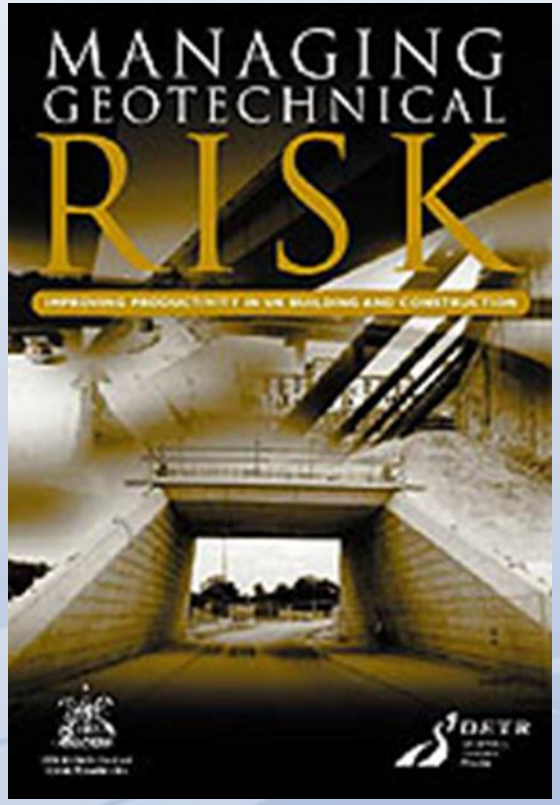
- **An expensive way**
- **A cheaper way**

The Expensive Way is after Construction has begun and you have started digging

The cheaper way is during scoping and design

Mott MacDonald

2001



‘Building and construction case records show that ground conditions are often the cause of very large cost and time overruns. Geotechnical risk can affect all those involved in construction, including the client, the designer and the constructors.’

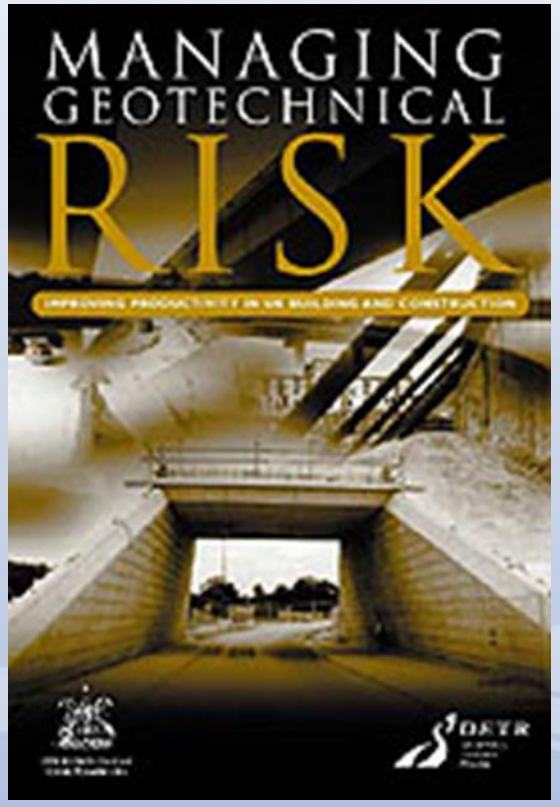
C.R.I Clayton Managing Geotechnical Risk: Improving productivity in UK Building and Construction (2001).

Mott MacDonald

2001

‘Ground-related problems can adversely affect project cost, completion times, profitability, health and safety, quality and fitness for purpose, and can also lead to environmental damage (including whole life carbon impacts) - not forgetting the corporate damage that can ensue when things go wrong .’

Paul C Maliphant after C.R.I Clayton Managing Geotechnical Risk: Improving productivity in UK Building and Construction (2001).



Mott MacDonald

2009

‘For the last decade, the industry has been sheltered by a healthy economy. This has enabled construction to prosper without having to strive for innovation. The current economic crisis is a perfect opportunity for us to think again. We can not afford to waste it.’

Never Waste a good Crisis: A review of progress since Rethinking Construction and Thoughts for our Future (2009)

Mott MacDonald

2009

	Netherlands (Geo-Impuls)	UK National Infrastructure Plan
Investment	50bn Euros per annum	£250bn (over 5 years)
Construction failure cost	10%	£25 billion
Ground related failure cost	5%	£12.5 billion
Target savings	2.5%	£6.25 billion

What could we do with an extra £6.25 billion?

Mott MacDonald

UK Country Report Conclusions

Country	Conclusions on integrating GeoRM – Project RM
United Kingdom	In the UK it is considered that we have not learnt and implemented good and best practice of GeoRM and ProjectRM from the past. This results in: • Fuzzy risk terminology • Lack of risk-focused evidence • Standards not focused on value adding inputs and beneficial outcomes • Lack of risk-competent resources • Non-ideal training and education approaches • Team attitudes that are not always right and can be negatively influenced by poor contracts • Inability to understand our audiences and how to best communicate with them

Mott MacDonald

Why do we still have a perceived problem?

"The problem is not the problem.

The problem is your attitude about the problem."

"The problem is not the problem.

The problem is ***our*** attitude about the problem."

Paul Maliphant after Johnny Depp

(Captain Jack Sparrow: Pirates of the Caribbean)

Mott MacDonald

So what should we do in the 2010's

- Update our research on the value of geotechnical risk management to demonstrate Return on Investment
- Hold a symposium in print (or similar) on the value of the risk management process with best value examples
- Make best use of the UK Register of Ground Engineering Professionals
- Champion leadership positions for ground engineers in project teams
- Improve procurement and contractual practice
- Design to add value and capture opportunities, not just follow due process
- Learn how to communicate inspirationally
- Speak inspirationally to fellow professionals and not just fellow ground engineers
- Update risk and opportunity management teaching in universities

Thank you for listening. Let us discuss!

Mott MacDonald

www.mottmac.com