

Safety-Related Risk Assessments for Global Climate Change

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1 Introduction

Most scientists agree that greenhouse gases are having an effect on weather patterns around the globe. However, many disagree about the extent of this effect. Even those that do not believe in a causal relationship between carbon emissions and a rise in temperatures in particular areas of the world can identify the effects of global climate change. These effects may be due to other longer term effects rather than the impact of industrialization. In either case, it seems clear that we should take steps to assess the risks posed by these changes.

There are many sources of information on the impact of global climate change. For example, there is the US National Assessment of the Potential Consequences of Climate Variability and Change¹. There is an account of the UK government's initiatives at the G8 summit². The UK Department of Food, the Environment and Rural Affairs also provide information³. Some of these sources identify the impact that global climate change can have on safety. These effects range from the obvious risks associated with rising sea levels; although some scientists question whether levels are rising. Other safety-related effects are less obvious. For example a recent article in Air Safety Week (Sept. 27th 2004) reported that climate change may have had an impact on the patterns of bird strikes in the aviation industry⁴.

2 Tool development

Your task in the open assessment is to develop a tool that companies can use to help them assess the risks that global climate change will pose for their organization. This brief is deliberately very broad. You can simplify matters, for example, by focusing on particular businesses such as nuclear power generation or coastal fishing industries. You might also choose to support risk assessments in particular geographical areas. Irrespective of the area chosen, you must help managers to identify the health and safety implications of global climate change for their workforce and for members of the public who might be affected by their operations.

The risk assessment tools can be extensions of existing techniques, including Fault Trees and FMECA that will both be covered in the lectures. However, if you do this you MUST show how these approaches have been tailored to address the specific issues associated with climate change. Alternatively, you might develop software tools that can be used to construct risk matrices. This would enable the user to work through the potential consequences of a hazard and review the scientific basis for predictions about the frequency of adverse events, such as floods or hurricanes.

3 Evaluation

It is important that you attempt to evaluate your risk assessment tools for the safety-related effects of global climate change. One means of doing this would be to ask a number of different 'analysts' or users to exploit your tool during an initial case study. For instance, two groups might be asked to assess particular

¹ <http://www.usgcrp.gov/usgcrp/nacc/default.htm>

² <http://www.g8.gov.uk>

³ <http://www.defra.gov.uk/environment/climatechange/>

⁴ http://www.findarticles.com/p/articles/mi_m0UBT/is_37_18/ai_n6282706

risks from a brief description of a company's operations. One group might be asked to do this with the support of your tool while another might be set the same task but without access to your system or technique. However, this raises important methodological concerns. Firstly, how would you insure that both groups have the same level of expertise and background knowledge so that any comparisons can be fairly made? Secondly, how would you go about assessing the quality of the risk assessments that each group develops? Please consult with me before conducting your evaluation so that I can provide advice in answering some of these questions.

4 Transferable Skills

This exercise will provide a first-hand introduction to the risk assessment techniques that underpin the operation and regulation of systems across a broad range of industries. The development of tool support will also provide some understanding of the problems that can arise when trying to apply these techniques. The risks associated with climate change are the subject of continuing research. In particular, regulatory and commercial organizations are only just beginning to understand the problems of preparing for environmental changes that are extremely difficult to anticipate. Hence many of the skills provided by this assessed exercise are in very scarce supply.

5 Assessment Criteria and Submission Details

This exercise is degree assessed. It contributes 30% to the total marks associated with this course. The body of the report should not exceed fifteen A4 pages. The report must be printed out and must be submitted in a secure binder. It must include:

- A title page containing your contact details (email etc);
- A table of contents and appropriate page numbers;
- A section on the tool that you developed.
- A section on the evaluation method that you used.
- A results sections.
- Conclusions.

In addition to the fifteen pages in the body of the report, you may also include appendices. These should contain the listing of any code used during the study together with suitable acknowledgements for the source of code that has been borrowed from other programmers.

The report should be handed in at the start of the lecture on Thursday 24th November 2005. Extensions will only be granted in exceptional circumstances and they should be requested as soon as possible. Extensions for equipment failures may be granted provided that you let me know as soon as they occur so that I can have them fixed as soon as possible. Please make sure that you keep back-up copies of all of your work. The following marking scheme will be applied:

- 15 for the method;
- 10 for the results;
- 15 for the conclusion;
- 10 for the technical documentation.

All solutions must be the work of the individual submitting the exercise and the usual plagiarism form must be attached to all solutions. All questions about this exercise should be addressed to Chris Johnson.