

IMPROVING PROGRAM PERFORMANCE IN STORM DAMAGE AREAS

1. Background

The COMRISK Conference 2005 was held in Kiel, Germany, on 18-20 April 18-20 2005. Representatives attended the conference from the North Sea countries of Belgium, Denmark, Germany, the Netherlands, and the United Kingdom. In addition, Charley Chesnutt of the US Army Corps of Engineers attended the conference.

COMRISK was a European Union project to assess common strategies to reduce the risks of storm damages in coastal lowlands. Over the four years of research under this international project, staff members of the Netherlands Rijkswaterstaat visited the United States and the Corps of Engineers, in particular to learn more about how planning for storm damage reduction projects is conducted in the United States and generally gather other pertinent information and ideas.

2. Purpose for Paper

The overall goal of the COMRISK project was the optimization of coastal risk management through an exchange of information and experiences. This conference provided a unique opportunity for the Corps to participate and to become more aware of how these countries deal with similar potential storm damage vulnerabilities. Based on the information that was gleaned from this conference, Corps practices were compared to the practices in other countries and evaluated to identify ways to improve program performance in the United States.

This paper will first discuss how projects are planned in these other countries and some of the issues dealt with in improving planning performance. In addition, it will summarize how project planning is done in the United States. Finally, it will discuss how to enhance planning performance and improve program performance in the Corps.

3. How Projects are Planned in the European Countries

The major underlying principle in planning and protection of lowlands in the European countries is the safety of the inhabitants. As a result, many of the countries have legal requirements to provide a specific level of protection.

For instance, in Germany, every citizen has the right to the same level of protection. In the Netherlands, the specific level of protection varies from 1 in 10,000 years on the coastline to 1 in 4,000 years for secondary dikes to 1 in 1,500 years further inland. This is the legal standard established for the Netherlands.

While the other European countries do not have standards that are as strict, planning in those countries must also be done within the context of what is important to their

governments. In the United Kingdom, a more risk-based approach has been adopted based on a more explicit tradeoff of benefits and costs of action against the impacts of no action. In the United Kingdom and Denmark, government focus is on a wider variety of measures than in the other countries that focus mainly on the prevention of flooding. The concept of coastal flood risk management is eminent in all of the countries as they focus on managing both the probabilities and consequences of coastal flooding. In addition to the standards based on existing conditions, many countries have also factored in eustatic sea level rise and are making their dikes higher and wider to accommodate the extreme predictions.

Part of the reason for the stringent standards is that countries like the Netherlands are resource and space challenged. In addition, the Netherlands is one of the most densely populated countries and safety, building projects to last, and maintaining projects are very high priorities. The question, that all of these countries are facing now, is can these high safety standards be maintained? It is very costly to build projects that essentially will never be overtopped and never fail.

The issue that all of the countries are now dealing with is what levels of risk and uncertainty are acceptable in their project planning. They are also looking at whether some of the risk can be shifted to individuals. Should the responsibility for safety be shared between country and individuals? What are the legal impediments to moving to a risk-based approach?

While the Corps made such a shift to a risk-based approach, these other countries are scrutinizing the pros and cons to such an approach and whether it should be science-driven or budget-driven. Does a risk-based approach really lead to better information, more efficient projects, and reduced expenditures in the future? Discussions and debates will continue until all are convinced that these three questions can be answered affirmatively.

4. The National Flood Insurance Program in the United States

The United States has implemented the National Flood Insurance Program. The effects of this program on the planning and management of coastal and inland resources at risk from storms are significant. A similar program has not been instituted in these countries. The flood insurance program was introduced in the United States to control unwise flood plain and coastal development and afford inhabitants of those areas insurance against their losses.

It was recognized that the wise use of flood hazard areas should be encouraged and that existing inhabitants could not all be protected from damages by the government. Residential properties that existed prior to establishment of the program are entitled to purchase flood insurance. Residential properties constructed after the establishment of the program must meet the stringent first-floor elevation criteria established by the program to be eligible to purchase flood insurance.

Over time the program has become self sufficient by charging actuarial rates for insurance on properties built after the program was established. In essence, flood plain inhabitants

are accepting most of the risk of the damage consequences by purchasing flood insurance. The debate for the European countries is whether the responsibility for providing safety and protection can be lessened by promoting insurance to recover from the damage consequences. Given the long tradition, existing legal statutes, and the general context of government and citizen expectations, a policy shift such as this would require a major realignment of government and private investment.

5. The Risk-Based Approach to Planning and Managing Flood Hazard Areas in the United States

The shift to a risk-based approach in the United States occurred without significantly analyzing the pros and cons and debating the issue for decades. It was partially budget-driven as resources were simply not available to provide a high level of protection to all feasible flood control and hurricane/storm damage protection projects and partially science driven. While for years a high level of protection standard was encouraged for urban areas and for reservoir projects, the flood insurance program standard of a 1 in 100 year level of protection became more uniformly accepted by communities at risk.

In addition, it had always been recognized that project analyses were only as good as the historical record of storm events and to select one flood level to represent a level of protection had a high degree of uncertainty. There was a push to improve our analytical analyses by identifying the uncertainty in each of the key variables applied in the evaluation. This would result in better information that could be statistically supported to advise decision makers and project sponsors of the real risk (probability of events times the consequences) and confidence interval of protection at a certain level.

This information could also be used to convey the risk, the confidence interval, and the magnitude of residual damages at that protection level. The improved data collection and analysis would allow calculation of the risk at various levels of protection and allow a more defensible communication of the risk, uncertainty, and confidence interval to the public than the previous calculation of an average. If we had placed a greater emphasis on data collection, the uncertainty of the variables could have diminished and the confidence in the results could have increased.

5. Opportunities for Enhancement of Planning Performance

While the risk-based approach provides significantly more information for Corps planners to do sound planning and influence decisions, it also presumes sophistication on the part of the users of the information to be effective. Without a good understanding of the implications of risk-based information, the public will not react as planners expect.

Most of the general public has not received training of this kind and can be easily confused by the statistical reporting. Therefore, there is a moral responsibility to educate the public so that there is a clear understanding of the expected project performance and the residual damages. If the public is not well informed and educated in risk analysis, they could have a false sense of security and not make economically rational decisions as they

make further investments in storm damage or flood risk areas. This only leads to greater damages when a major flood or storm event occurs. In order to insure that project planning assumptions are accurate and planning performance is enhanced, public education must occur.

6. Opportunities for Enhancement of Program Performance of the Corps

The risk-based approach makes sense for the United States where the expectation is that the risk should be shared by the government and those affected. In addition, the flood insurance program has been very effective in managing new development in flood hazard areas and providing a mechanism for government to share the risk. The purpose of this paper is not to debate either of those decisions. Rather, the purpose is to investigate how the program of the Corps can be further improved to better serve this nation.

We should learn from the experience and the emphasis of the other countries. Safety and avoiding loss of life is extremely important. Moving from safety standards to risk management inherently requires a significant investment in data collecting, management, and analysis because risk management requires a decrease in the uncertainty of risk over time or an increase in our confidence of our statements. This is essential because you cannot increase confidence without reducing uncertainty. The following are specific recommendations, as a result of comparing and evaluating the planning in other countries to the risk-based approach of the Corps, for enhancing the program performance of the Corps:

- There should be a significant investment in data collection, management, and analysis because risk management expectations are that there will be a decrease in the uncertainty of risk over time and an increase in the confidence of our statements.
- Projects should not be constructed and turned over to a non-Federal sponsor without continued monitoring by the Corps.
- There is a difference between telling people they are safe (safety standard approach) and telling people the degree of danger they face (risk-based approach).
- It is the moral responsibilities of the government in a risk based approach to not only continue to monitor constructed projects and their performance but also to educate the public on changes in risk and levels of protection.
- Conditions are ever changing and the public should be kept informed of any changes that may adversely impact them.
- There needs to be an ongoing communication with the public. The public must not only have a better understanding of the natural processes, the risk, the uncertainty, and our confidence in these numbers but must also understand how these things are changing over time.

- Performance measures should be established to monitor economic development benefits and environmental benefits.
- Project performance should be documented by doing studies to measure project effectiveness over time.
- Project performance results should be reported to Congress and the public.
- It should be recognized that risk analysis in the Corps deals mainly with economic consequences. Not included is loss of life, impacts to quality of life, and social well being. Why should these attributes be less important to the United States than they are to other nations? There needs to be performance measures established to document the value of these non-economic attributes.
- After performance results are shared with the public and Congress, a feedback loop is needed to discuss the effectiveness of the information reporting and offer the opportunity for suggestions on how to improve performance for existing and future projects.
- In addition to monitoring, post-construction studies are essential so that adaptive management can occur when and where needed.

Finally, there is a general lack of public awareness of flooding and coastal risk. While general education of the public is valuable, establishing school programs to educate students on flooding and coastal hazards at an early age is critical in assuring that program performance information and risk assessment information is understood as these students become young adults in the future.

The question is not how effective are individual Corps projects in reducing risk. Rather it is how effective is the Federal Flood Plain Management effort, (i.e., the combination of Corps and FEMA programs). Are we protecting the public and helping the public to understand the full extent of the risks - economical as well as to their personal safety and to their future quality of life. Studies should be initiated to evaluate the overall effectiveness of the Federal Flood Plain Management effort.

7. Conclusions:

The COMRISK project provided a unique opportunity for comparing planning approaches of the different European countries to the United States. In doing so it became apparent that the safety standard approach and the risk based analysis approach are both being applied to plan and manage projects. The approach selected is related to the context of what is important to the governments of the different countries. There is no right or wrong way to plan for the protection of storm damage areas just different philosophical perspectives.

While the United States is more willing to share the risk of damages with inhabitants of these areas, education of the public in risk analysis findings must occur to avoid a misunderstanding of the information and conveying a false sense of security to the public. The comparison to other countries and their discussions on the pros and cons of a risk-based approach also assisted in the self-evaluation of the effectiveness of Corps planning and the Corps program in general. While the risk based approach may improve our analytical analyses and avoid costs for over designed projects, it must have continual data collection, monitoring, analysis, and education to convey the changing risk and uncertainty.

It is the moral responsibility of this country in using a risk-based approach to continue to analyze data and lessen uncertainty over time. Without better information and continued learning, the risk based approach falls short of the analytical expectations of its proponents and may jeopardize the safety of our people in storm damage areas.