EXTERNAL EVALUATOR'S REPORT

of the Research Activities of the

DISASTER PREVENTION RESEARCH INSTITUTE (DPRI)

KYOTO UNIVERSITY
GOKASHO, UJI, KYOTO 611-0011, JAPAN

by

The External Evaluator:

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EXECUTIVE SUMMARY

As a result of his review of the research activities of the Disaster Prevention Research Institute of Kyoto University, the External Evaluator, K.W. Hipel, would like to make the following recommendations, which are explained in detail in this report.

Recommendations

1. Develop a *mission statement*.
2. Foster *integration* of research areas.
3. Encourage *creativity*.
4. Have a *merit* component for salary increase.
5. Grant *sabbaticals* to deserving researchers.
6. Present *research awards* to outstanding researchers.
7. Devise a clear *promotion* policy.
8. Come up with strategies for *graduate student recruitment*.
9. Adopt an *External Examiner System* for judging doctoral theses.
10. Increase *external funding* for DPRI.
11. Expand *external contacts*.
12. Follow an *implementation science* policy.

BACKGROUND

Challenges Facing the Disaster Prevention Research Institute

The Disaster Prevention Research Institute (DPRI) of Kyoto University executes leading-edge international research on a broad range of challenging problems connected with the prevention or reduction of natural disasters. Indeed, since it was founded in 1951, DPRI has purposefully evolved from a national research organization within Japan to a highly respected and internationally known research institute. In fact, in a number of key areas in disaster prevention and risk analysis, DPRI is the world leader. Accordingly, both faculty and staff at DPRI are sincerely congratulated for their continued pursuit of research excellence that is benefiting citizens and organizations within Japan and many other nations around the globe.

Personnel within DPRI are highly cognizant of the fact that research organizations can never rest upon their laurels. Research is by its very nature a dynamic endeavor that is ever changing, evolving and expanding, often in unexpected directions. An established research record, such as the hard-earned reputation of DPRI, does, nonetheless provide a sturdy launch pad of valuable experience and success, for launching a creative and insightful research plan for the future. Keeping research at the forefront of a clearly highly competitive international activity and also relevant, so that many people and organizations can become benefactors, are not the only difficult hurdles that DPRI must overcome. Additionally, within Japan, the central government has mandated that all national universities are to become Independent University Corporations (Dokoritsu Daigaku Houjin) in a planned process that is commencing in 2004. This provides DPRI and Kyoto University with the opportunity to more firmly grasp their academic destiny in their own hands and thereby wisely plan for a bright and promising future. On the other hand, the Japanese Government will most certainly provide less funding and hence governmental institutions must devise imaginative ways for securing research grants and contracts from government agencies, industry, international organizations and elsewhere around the world.

Evaluation Procedure

Due to the foresaid and other reasons, DPRI sagely decided to conduct an independent and external review of its research activities. As a consequence, in early December 2003, DPRI invited nine External Evaluators to participate in the process, including two Americans and one Canadian. The duties of the Evaluators took place within the following three stages:

a) In December 2003, each Evaluator was emailed extensive documentation regarding the research activities of DPRI, including a Self-Assessment Report which describes how DPRI addressed recommendations put forward by the 1998 External Evaluators. Each Evaluator filled in an assessment form which judged how well DPRI has progressed according to the recommendations since 1998. This form was submitted to DPRI officials in January 2004 when the External Evaluators were visiting DPRI.

b) In Japan, the External Evaluators participated in a two-day review at the DPRI facilities located on the Uji campus of Kyoto University. Specifically, on Wednesday, January 14th, 2004, K.W. Hipel and other External Assessors carried out extensive interviews with research groups and specific individuals, and toured laboratory facilities. Later in the afternoon, presentations regarding research objectives and accomplishments were delivered by leaders of each of the eleven main research groups. On Thursday, January 15th, K.W. Hipel was the first of the seven External Evaluators who visitied Uji to give a PowerPoint presentation about his evaluation of the research activities of DPRI, especially within the new Independent University Corporation System which will start to be implemented by all public universities in Japan starting in May, 2004. The speech delivered by K.W. Hipel is included as an appendix in this report.

c) A final written report by each Evaluator was to be completed by the end of February, 2004, to DPRI. This document constitutes the written evaluation furnished by K.W. Hipel.

Evaluation Objectives

As stated in Document D provided by DPRI, the objectives of Members of the External Evaluation Committee are to:

(i) Evaluate the achievements of the DPRI with respect to meeting recommendations made by the 1998 External Evaluators.

(ii) Advise DPRI about future research directions.

(iii) Provide opinions regarding the functions of DPRI and its connections with other organizations.

(iv) Furnish any other opinions that may assist DPRI.

K.W. Hipel believes that DPRI has made admirable progress in meeting virtually all of the recommendations suggested by the 1998 External Evaluators. He indicated this in the completed evaluation form (Document A3.xls) that was submitted to DPRI on January 16, 2004, in Uji. Nonetheless, given the new Independent University Corporation System and other factors discussed above, DPRI has a unique historical opportunity to deliberately plan to prosper even in the face of many difficult challenges. Accordingly, in the upcoming sections of this report, K.W. Hipel puts forward ideas that DPRI may wish to consider for planning and executing what will most certainly be an exciting voyage within an ever-changing world that desperately needs the types of services and advice that DPRI is capable of rendering. The recommendations and suggestions address the objectives stated in items (ii) to (iv) and some of them are extensions of ideas made by the 1998 Evaluations under item (i). The ensuing discussions largely follow the order of presentation given in K.W. Hipel's overheads from his January 15th speech provided in Appendix A, but in much more depth.

MISSION STATEMENT

A mission statement will provide an overall direction for DPRI to follow, while objectives and goals will assist DPRI in achieving the overarching main mission, and keeping DPRI on course as unforeseen challenges and opportunities arise. The metaphor of skiing can be kept in mind when creating a mission statement. When the downhill skier (organization) is at the top of mountain surveying the landscape (challenges) he or she must decide roughly where he or she wishes to go (general direction). As the skier skis down the mountainside he or she should take advantage of opportunities to ski on some exciting slopes (meet specific objectives and take advantage of opportunities) and avoid dangerous routes (pitfalls and unforeseen difficulties).

An example of a mission statement based on information found in literature published by DPRI is that DPRI should:

Make significant contributions to natural disaster reduction as the basis for having a safe and secure society under sustainable economic development.

Professor Steven J. Burges from the University of Washington in Seattle thoughtfully composed the following potential mission statement:

DPRI is committed to developing the science, engineering, and management skills needed to mitigate natural and man made disasters for the primary benefit of the Japanese people as well as being a world renowned center of excellence in disaster mitigation and management with particular emphasis in Asia.

The need for a Mission Statement was not only mentioned by many of the External Evaluators but also by DPRI personnel. Consequently, this Evaluator would like to put forward the following suggestion:

1. Mission Statement Recommendation: *DPRI personnel should jointly develop an explicit mission statement for their organization that clearly states its overarching mission, objectives and goals. One way to accomplish this is to hold one or more retreats involving all faculty members in order to craft a thoughtful mission description. This kind of activity will not only furnish a good explanation for people outside of DPRI to understand what DPRI represents and accomplishes, but also it will encourage communication and integration within and among research groups at DPRI. In addition to explaining what DPRI wishes to achieve, the mission statement should clearly identify its clients and benefactors. Management and research activities at DPRI can thereby be purposefully designed for fulfilling DPRI's mission. The participation of DPRI members in reaching a consensus about a mission statement is a key step in integrating their individual, group and inter-group research activities.*

INTEGRATION

Currently, DPRI has the following five **Research Divisions:**

- Integrated Management for Disaster Risk
- Earthquake Disaster Prevention
- Geo-Disasters
- Flurial and Marine Disasters
- Atmosphere Disasters

and the following six **Research Centers:**

- Research Center for Disaster Environment
- Research Center for Earthquake Prediction
- Sakurajima Volcano Research Center

- Water Resources Center
- Research Center for Disaster Reduction Systems
- Research Center on Landslides

The above eleven research groups can be further subdivided into more specific research units, most of which are lead by a Full Professor who directs his or her own research team.

Just from reading the titles of the research groups, one can see that common research topics may fall within more than one of the eleven groups. Moreover, much of the research is highly scientific and thereby adheres to sound scientific research standards. This in turn means that, by definition, individual research is often narrowly focused so that hypotheses can be subjected to the rigors of the scientific method. Hence, a myriad of specific scientific problems are being investigated in great detail, which goes against the concept of integration across areas and interdisciplinary work from engineering and social science perspectives. Therefore, personnel at DPRI must be particularly vigilant at actively encouraging integration across many areas in the theory and practice of disaster and hazard prevention and mitigation from an integrated risk management perspective.

2. Integration Recommendation: *DPRI should adopt strategies for encouraging integration across its many research areas. Some progress is already being made towards more integration. For example, at the general meeting held on January 15, 2000, a DPRI researcher used a table to explain how the existing eleven divisions and centers could be categorized into four main research themes. The Research Center for Disaster Reduction Systems is now actively cooperating with the Division of Integrated Management for Disaster Risk. Whatever the case, far more cooperation and integration within and across research areas is needed to enhance the effectiveness of DPRI and also reflect the integrative reality of hazard problems existing in the realworld. To achieve meaningful integration, this Evaluator believes that the Division of Integrated Management for Disaster Risk be assigned a prominent role in taking basic scientific research findings from all research groups and incorporating them into policies and decision making so society will benefit. Another mechanism to encourage integration is for DPRI to continue tackling practical and worthwhile risk problems that go across research groups. There is nothing like a practical challenging problem for focusing and coordinating the efforts of many experts from science, engineering and the social sciences, to come up with reasonable solutions, even in the face of uncertain and conflicting information. Large projects funded by industry and government from Japan and abroad should be highly encouraged as long as they enhance DPRI's mission.*

ENCOURAGING CREATIVITY

To solve formidable hazard problems dealing with risk and many stakeholders across society, creative thinking is required. Below are some suggestions for fostering original thought.

3. Encouraging Creativity Recommendation: *DPRI should devise clever ways for stimulating creative problem solving by its personnel, such as:*

- *Fostering a challenging, yet friendly, research environment.*
- *Pursuing meaningful and worthwhile research goals*
- *Rewarding productive researchers through salary merit increases and other means.*
- *Hiring excellent faculty members whenever there are openings through a competitive process.*
- *Actively encouraging females and people from across Japan to apply for faculty positions.*
- *Attracting the best Japanese and international students.*

MERIT

Productivity in any organization boils down to the pursuit of excellence by each individual. One of the most direct and meaningful ways to reward outstanding work by a person is, to state it bluntly, to pay him or her more. Hence, DPRI may wish to financially reward each highly productive person beyond that which is done for average performance.

4. Merit Recommendation: *DPRI should consider adopting a merit component to its salary increases for its personnel. Both faculty and staff members should receive special salary increases on an annual basis for outstanding performance. However, the recommendations given next are mainly explained for the case of faculty researchers. By having in-depth discussions at a retreat or faculty meeting and by finding out what happens at other well-respected research institutions, DPRI personnel should jointly develop agreed-upon criteria for evaluating the performance of a faculty member on an annual basis. These criteria should reflect actions that contribute to fulfilling the mission of DPRI. One indicator of outstanding research productivity may be the publication of four fully refereed papers in one year in highly regarded journals. A format for putting together an Annual Activity Report by each faculty member should be devised. Finally, the members of a Performance Assessment Committee, who judge and rank each faculty member according a performance scale, should meet on an annual basis just after the compulsory submission of an Annual Activity Report by every faculty member. The membership of this committee should be clearly specified. For instance, DPRI may decide that the committee should consist of the Director of DPRI and three professors who are elected by all faculty members. Any merit increase should be incorporated into the base salary of the recipient. With respect to staff members, assessment criteria, an appropriate format for the Annual Activity Report and membership of the Performance Staff Assessment Committee, should be developed.*

SABBATICAL SYSTEM

Most major research institutions have a sabbatical system in place for deserving personnel. There is no reason why DPRI should not be the first major research organization in Japan to adopt a regular sabbatical system which is open to all of its faculty members. Besides serving as a means to keeping its productive professors, a sabbatical system would encourage world-class researchers to apply for employment at DPRI whenever there are openings. Moreover, while on sabbatical, DPRI researchers would have an opportunity to gain new knowledge and ideas from abroad for enriching their research activities at DPRI and they would also act as international ambassadors for DPRI.

5. Sabbatical Recommendations: *DPRI should form a committee to draw up plans for a regular sabbatical system for participation by any productive researcher. This committee would consult widely with DPRI personnel and carefully examine sabbatical systems in other countries before putting a proposal before all DPRI personnel for modification and eventual adoption. There are some key components that this committee may wish to entertain when designing a sabbatical system. Finally, only a productive researcher would be eligible for applying for sabbatical and a productive researcher must officially apply for sabbatical on his or her own initiative using a standard application form. Secondly, a productive researcher would be eligible for a six month sabbatical after the completion of each three years of service or for a full year after each six*

years of work. Thirdly, each person granted a sabbatical leave must spend the entire sabbatical time at another research organization or appropriate institution outside of Kyoto University and preferably in a foreign country. Fourthly, DPRI would continue to pay each person on sabbatical a portion of his or her salary. The usual payment range is from 50 to 100%. Finally, upon his or her return to DPRI after completing a sabbatical, the sabbaticant must submit a written report of his or her achievements while abroad which includes an explanation as to how his sabbatical activities benefited DPRI.

RESEARCH AWARDS

In addition to merit and sabbaticals, another key way to encourage excellence in research is through special awards.

6. Research Awards Recommendation: *DPRI may wish to strike an Awards Committee in the near future to draw up plans as to how deserving faculty members can be acknowledged in terms of special types of recognition awards. For example, DPRI may wish to present on an annual basis the DPRI Excellence in Research Award to the DPRI researcher who produced the most outstanding research results during the previous year. This exceptional individual would be identified by the Performance Assessment Committee when it is evaluating the Annual Activity Reports submitted by all DPRI researchers. The award would be framed and officially presented to the recipient on a special ceremony or perhaps as part of the Convocation Ceremonies of Kyoto University. Moreover, the awardee would be invited to deliver a public address describing his or her key research ideas and a description of the winner's accomplishments would appear in appropriate DPRI literature. Besides managing an internal award, the Awards Committee, or a subcommittee formed by the Awards Committee, would actively ensure that all deserving DPRI faculty are nominated for prestigious national and international awards. For example, an outstanding researcher working in water resources may be a suitable candidate for being nominated to receive the prestigious Stockholm Water Prize or become a Fellow of the American Society of Civil Engineers (ASCE). This is an extremely important task that is largely overlooked by most major research institutions. DPRI will continue to build a strong international reputation through excellence in research findings produced by its faculty members and also by the explicit recognition of this excellence via the receipt by individuals of highly-regarded national and international awards. Finally, one policy for DPRI to follow when deciding upon the allocation of internal funding for individuals and research teams, is to financially reward dynamic research teams having members whose research excellence has been externally recognized through the receiving of key awards.*

PROMOTION OF FACULTY MEMBERS

Having a transparent and fair advancement process for faculty members constitutes another means for enticing outstanding researchers to remain at DPRI and attracting dynamic new professors.

7. Promotion Recommendation*: A DPRI committee may wish to study ways for improving promotional policies of faculty members. One suggestion is to ensure that policies clearly explain*

what is required of Assistant, Associate and Full Professors. Criteria should be drawn up that explicitly reflect what is required of an individual for being promoted from Assistant to Associate as well as Associate to Full Professor. Moreover, Research Associate positions should be converted to Assistant Professor status. Finally, a mentoring system should be in place for providing advice to newly-hired Assistant Professors.

STUDENT RECRUITMENT

Besides possessing highly qualified and productive faculty and staff, DPRI must have even more exceptional students in its midst in order to produce high quality research.

8. Student Recruitment Recommendation: *DPRI should form a task force to investigate ways of attracting more gifted Master's and Ph.D. students from both Japan and overseas to carry out advanced research with DPRI personnel across all areas that fall within DPRI's mission. This task force will, no doubt, come up with a range of innovative ways of enticing excellent graduate students who will not only produce leading-edge research with DPRI faculty members but also become highly-informed individuals who will receive meaningful employment in industry and government subsequent to graduation. This advanced education and training of highly qualified people by DPRI employees, will be of direct benefit to society as a whole. Whatever the case, the DPRI task force may wish to implement measures to attract excellent graduate students, including:*

- *Promoting exciting research opportunities for graduate students by use of the internet, mailing printed documentation and other means.*
- *Offering generous scholarships to both Japanese and foreign graduate students.*
- *Continuing to develop close relationships with senior undergraduate students on the main campus of Kyoto University by teaching courses and delivering enticing research seminars.*
- *Encouraging international exchange programs such as the very active exchange program with the University of Waterloo.*
- *Deciding upon an optional number of graduate students such as three Ph.D. and two Master's students per faculty member.*

PH.D. EXTERNAL EXAMINER SYSTEM

DPRI should be highly commended for inviting External Evaluators to provide advice as to how its research activities can be improved. To maintain high quality research standards by doctoral students both in reality and perception, DPRI may wish to implement an External Examiner system for all doctoral theses.

9. Ph.D. External Examiner Recommendation*: It is highly recommended that DPRI immediately adopt an External Examiner system for evaluating all Ph.D. theses and thereby become the first major research institution in all of Japan to do so. After all, DPRI is already a first-class research institute and theses produced by its doctoral students should be judged by the world's top experts. This very low-cost initiative would not only enhance DPRI's academic prestige through the publication of even better doctoral theses and associated journal papers but it would provide a mechanism whereby foreigners and well-known Japanese academics would visit DPRI on a regular basis. To be invited as an External Examiner of a Ph.D. thesis the*

candidate's credentials would have to be examined by a DPRI committee to make sure that he or she is a global leader in the area of the doctoral research. Moreover, the candidate would only be approved if he agrees to read the thesis in advance of an Oral Ph.D. Defence held at DPRI and which the External Examiner must attend. Additionally, each External Examiner would be invited to deliver an invited lecture while visiting DPRI for taking part in the defence, and, of course, the External Examiner would be given a tour of DPRI research facilities. This would create an "emotional attachment" of the External Examination to DPRI and perhaps a lifetime association with DPRI researchers.

CONNECTIONS AND NETWORKING

To survive in the new Independent University Corporation, DPRI must further increase its contact with outside organizations and individuals. Some means of doing this are furnished under recommendations 5 to 9. Other mechanisms for increasing DPRI's influence are given below.

10. Increased External Funding Recommendation: *Under the new Independent University Corporation, DPRI will be responsible for obtaining more external funding to support its research activities. Accordingly, DPRI should highly encourage its research groups and individuals to actively pursue obtaining research contracts and grants from industry and government in Japan and abroad, which fall under the mission of DPRI. The monies obtained from such sources can be utilized for paying graduate students, covering infrastructure costs, financially supporting staff, and other purposes.*

11. Increased External Contacts Recommendation: *Obtaining external funding is made possible via contacts with organizations and people outside of DPRI. Hence, DPRI may wish to form a committee that could, through dialogue with DPRI faculty members and staff, come up with a list of recommended ways for making DPRI more widely know than it is now. For example, DPRI members could be encouraged even more to offer their services to help out with natural disasters whenever and wherever they arise. In the past, for example, DPRI has developed an impressive reputation by taking immediate action to jointly study earthquakes that took place in Japan, Turkey, China, Iran, and elsewhere. Moreover, DPRI can continue to invite Post Doctoral Follows and foreign and Japanese professors to spend short or long periods of time at DPRI to execute joint research with DPRI personnel.*

LEADERSHIP

To maintain and expand its reputation as an important international institution for executing leading-edge research in disaster prevention and risk assessment, leadership must be demonstrated at all levels within DPRI. As an organization, decisive action is required at the management level to implement the recommendations given herein and elsewhere as soon as possible. Research groups and individuals will then have a mission statement to follow within a system that "rewards the doers" as they strive for excellence in pursuing specific research problems as well as problems that require an integrative and multidisciplinary approach.

12. Implementation Science Recommendation*: DPRI should make sure that all of its basic research results are used to enhance decision making about disaster problems in a process called Implementation Science. By actually using research results in the realworld through the adoption of appropriate policies and decision making, DPRI will directly exhibit how it benefits society as a whole and specific organizations in particular. Part of Implementation Science could be an Adaptive Management paradigm that would allow DPRI to take immediate advantage of new opportunities whenever they arise.*

APPENDIX A

DPRI Assessment:
Comments and Suggestions

Professor Keith W. Hipel
Department of Systems Design Engineering
University of Waterloo

Presentation by

Professor Keith W. Hipel

given at

DPRI in Uji, Japan

on

January 15, 2004

Progress Report

Faculty members at DPRI are heartily congratulated for the excellent progress that they have made in virtually all DPRI activities since 1998.

Mission Statement

"Make significant contributions to natural disaster reduction as the basis for having a safe and secure society under sustainable economic development."

- Have a retreat to develop an overall mission statement, objectives and goals.
- Identify the client (society?)
- Design management and research activities of DPRI to fulfill the mission.

Integration

- Divisions and centers have been grouped according to research themes.
- Integrated Management for Disaster Risk has a key role to play in taking basic scientific research findings from all groups and incorporating them into policies and decision making so society will benefit.
- Tackle practical and worthwhile risk problems that go across research groups.

Encouraging Creativity

- Pursue meaningful and worthwhile research goals.
- Foster a challenging, yet friendly, research environment.
- Reward productive researchers through salary merit increases and other means.
- Hire excellent faculty members whenever there are openings through a competitive process.
- Actively encourage females and people from across Japan to apply for faculty positions.
- Attract the best Japanese and international students.

Merit

- Develop criteria for evaluating performance of a faculty member on an annual basis.
- Criteria should reflect actions that contribute to fulfilling the mission of DPRI.
- Example: outstanding productivity may be four papers per year published in high quality journals.
- Incorporate a merit increase into the base salary of a professor.

Other Incentives

- Present special research recognition award to an outstanding DPRI faculty member on an annual basis.
- Have a committee that ensures deserving faculty are nominated for prestigious national and international research awards.
- Adapt a sabbatical system that is available to all productive researchers.
- Fully fund and staff all dynamic research teams.

Graduate Students

- To achieve research goals of the Mission Statement, excellent Master's and Ph.D. students are needed.
- Develop strategies for attracting outstanding graduate students both from Japan and abroad.
- Research intensive engineering schools often have about five graduate students per faculty members.

Student Recruitment

- Promote exciting research opportunities.
- Offer generous scholarships to both Japanese and foreign students.
- Continue to develop close relationships with students on the main campus.
- Encourage international exchange programs.

Other Innovations

- Enact an External Examiner system for all Ph.D. theses. Because DPRI is a first-class research institute, theses should be judged by the world's top experts.
- Convert Research Associate positions to Assistant Professor status.
- Develop policies that clearly explain what is expected of Assistant, Associate and Full Professors.
- Have a mentoring system for new professors.

Leadership

- Take decisive action to make DPRI the undisputed world leader in disaster prevention and risk research.
- Tackle risk problems that benefit citizens of Japan and many other countries.
- Ensure that all basic research results are used to enhance risk decision making – implementation science.

- Adopt an adaptive management approach for DPRI to take full advantage of new opportunities.