

2008 VICTOR L. REGNIER TRAVELING FELLOWSHIP

DESIGNING FOR DECONSTRUCTION

TAKING ONE STEP AT A TIME TOWARDS
SUSTAINABLE DESIGN

“WE DO NOT INHERIT THE EARTH FROM OUR
ANCESTORS, WE BORROW IT FROM OUR CHILDREN.”
– NATIVE AMERICAN PROVERB

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Date of Submittal:
January 7, 2008

PROPOSAL

Over the past few years, the concept of green building has progressed considerably; it is now much better understood as a practice and strongly considered by many owners. Though sustainable design has been practiced for many decades, it has more recently been catching the eye of various professions across the United States. With more and more consideration for delivering triple the bottom line, thinking green is the new swing for the construction industry and its professionals. Thanks to programs such as LEED™ and Green Globes, owners are now able to see the benefits of going green while still saving money through efficient systems, payback periods, and production levels.

Though the push for sustainability is growing rapidly in the United States, we are still thought to be behind compared to many other countries in the world. Europe, for instance, has a plethora of countries in which a sustainable mentality is not only upheld, but benefited from in numerous ways. By looking to our contemporaries, we enhance our understanding of these benefits and perhaps will adopt this mentality. Americans then will be better prepared to address our own problems through sustainable solutions.

I am focusing my proposal on the concept of deconstruction for both residential and commercial buildings. Current construction practices focus solely on the assembly of materials and components with the goal of simply producing a final building. With such a linear view of the built environment, the life-options for materials when a building has reached the end of its service life are severely limited. I am aware that in America we have already found ways of benefiting through salvaging materials for reuse or recycling, and while I support these practices, I would like to push my focus further and discuss the concept of *Designing for Deconstruction*. This concept is simply thinking about how to design a building to be deconstructed after its intended use. Once the building has been deconstructed, the designing also needs to take into account the economical benefits of diverting the building materials elsewhere; whether it is refabrication, reuse of material, or recycling.

Because of the complexity and integration of building components, my goal is to look at case studies of projects that have been either completely deconstructed and reused or designed for deconstruction. I plan to interview a wide range of professionals to further determine how they made designing for deconstruction economically feasible. I plan to compare the cost and construction/deconstruction durations of each sustainable design process with those of similar, but more traditional, design concepts. By interviewing the manufacturers and suppliers, I want to understand the refurbishing process so I know what materials must go through before they are used once again.

Interviews will be video recorded with the approval from the professionals to allow me to best retrieve information devoted to a specific subject matter. Using information gathered, I plan to edit interviews to create a documentary. I will also use the collected information to create a list of materials to determine the overall cost, life expectancy, ease of deconstruction, and refurbishing. Comparing these properties with traditional concepts and

materials will best show solutions for feasibility. My final goal is to determine the costs of raw construction materials in a projected 25, 50, and 75 years from now based on materials usage trends and projections. With the information gathered, I will share what I believe is the future for sustainability by taking what I have learned and implementing it throughout my career.

Some may feel that gathering this information may be difficult considering that I will be seen as a foreigner who recently graduated. However I feel very confident with my proposal, and believe that my experience traveling abroad as a foreign exchange student in Prague will be a great asset in overcoming these initial misconceptions. While abroad, I was asked to research and document the difficulties of the Czech's sewer system and to give a speech regarding European architectural history to students upon my return. I have attached the referred documents for your review. To better understand the travelling fellowship I have contacted previous winners Joe Karten and Mary Evens. They have mentored me by giving me their advice on subjects such as traveling, how they expanded the trip as well as their personal day-to-day activities while living abroad. I have garnered a lot of support regarding this proposal, and everyone involved is interested in the potential outcome.

I am a driven individual who is very focused on my career and where I want it to go and why. If I were to be accepted for the 2008 Victor L. Regnier Traveling Fellowship, I would become capable of creating physical evidence that could potentially change the way we design and construct buildings. Because of economic issues in the construction industry, the information I have collected and put into a final report may not be useful immediately. I know however that the data collected will be useful one day due the demand for construction and the limited supply of materials. The concept of green building is becoming more popular and we need to continue to find new and innovative ways to build better. Thirty percent of *all* waste is due to construction and deconstruction of materials. As the demand for reuse of land in urban areas increases, so should the need for refurbishment and redevelopment of existing infrastructures. Just because a building is up and running one day and no longer needed the next, doesn't mean that all of the materials used to create the building need to be thrown away. Changing the way we waste in construction could change the way we waste in other markets as well. If I were able to further pursue my proposal with the Victor L. Regnier Traveling Fellowship, I would be able live my dream of making a true difference.

TRAVELING PLAN

I plan to leave the United States in the fall of 2008 for the purpose of further gathering data and interviewing contacts here in the United States. My first travel stop will be in Edinburgh, Scotland where I will live for four months with two of my current roommates, Erik Peil and Andrew Haas. I plan on visiting the Robert Gordon University in Aberdeen, where designing for deconstruction experiments are conducted. Such practices include material cycle handling, material identification, simplicity of construction techniques, exposure of mechanical connections, independence of structure and partitioning, and making short life-cycle components readily accessible. Here, material systems are identified at three levels: the systems or building level, product level and materials level. The university

would not only provide me with an excellent example of case studies throughout Scotland and the UK but also with a better understanding of how to compare materials and the assemblies of these materials.

Also in Scotland is the Scottish Ecological Design Association, where they promote the ecological design of buildings with materials and systems which do not negatively affect the quality of life for future generations. They are the first committee in the UK to create a website strictly for designing for deconstruction. They have documented numerous case studies throughout the UK including the Arup Camus in the West Midlands. This building was designed with sustainability in mind by having the structural steel components with site bolted connections with precast concrete to allow for ease of dismantling in the future. The Scottish Ecological Design Association is looking to educate young professionals to facilitate the spread of eco-design through training programs. The cost to become a member is only 10 Euros and I will have access to a wide variety of members from numerous professions.

After my four months in Scotland and traveling to various case studies in the UK, I will focus my travels on the Scandinavian Peninsula beginning in Sweden. The Swedish government is focused on being labeled as “the greenest country in the world.” They have websites with numerous publications on sustainable development as well as host a number of conferences from which I could learn. Lisa MacKinnon, policy director for 1000 Friends of Wisconsin, will facilitate my contact with professionals who have designed for deconstruction before by including me in a one week sustainable development tour called Sustainable Sweden. During this trip all expenses will be included and I will be traveling all throughout Sweden examining case studies.

Heading west my next destination will be Oslo, Norway. I plan on contacting Filip Henley, who translated the book entitled “The Ecology of Building Materials.” I will purchase this book and later interview the author on important aspects of the reading such as the limited use of materials like copper, lead, tin, and zinc. I will travel to specific case studies where buildings have replaced finite resources with widely available resources and determine both the short and long-term effects of the substitution. I also plan to interview someone from the prefabricated housing company Hedalm Anebyhus. They are recognized as one of the best in manufacturing cost, low energy, low maintenance housing units. All of this is to better understand how we can create a closed loop system for building materials.

I plan to continue my focus on building materials by traveling to France to study the durability and maintenance of buildings. I plan to meet with a great friend of mine who will help me with translating during interviews and site visits. France has many architectural and international design firms focusing on educating the younger generations to better sustainable design by hosting free informational sessions. I am interested in attending these sessions as well as contacting a professor in Paris to understand the feasibility of design for deconstruction in the real-world. France has many historic buildings, and I am interested in what steps are taken in order to keep construction materials lasting for many decades. Understanding historical building concepts and the long-term maintenance of a building will help me better understand life expectancies and the refurbishing processes.

My last stop will be at one of the greenest places in the world, Vancouver, British Columbia. There is a case study of the Roy Stibbs Elementary School. The school was

completely destroyed by a fire on December 28 1993. The design team ended up dismantling a nearby secondary school and reusing 75% of the entire structure where it was re-erected using the original shop drawings. Ultimately, the contractors were able to shave five months off of the project schedule by salvaging the steel members. I am interested in interviewing many professionals as well as community members on the effects of designing for deconstruction.

British Columbia also has a website on which used materials and equipment are being sold throughout the province. With America becoming progressively more dependent on the internet, I am curious to further investigate the effectiveness of and reliance on the website by contacting some of the companies which have bought and sold materials from the website. I have contacted Cam Brewer from the Canadian Green Building Council to become a volunteer in updating certification levels for green building. Having this opportunity will allow me to understand innovative design in a country much closer to the United States.

CONTACTS

Through the large amount of support I have received, I have been able to develop a solid contact list of different professionals. The following list has been broken down by the region where I plan on traveling.

Scotland and the U.K. –

- **Former roommates Erik Peil and Andrew Haas** – These two individuals will be residents by the time I fly out to Edinburgh, Scotland. They are both graduate students studying structural engineering at Milwaukee School of Engineering and they are more than excited to welcome me and help get my feet wet in Scotland.
- **Mary Kelly** – Scottish Ecological Design Association Development Officer – will be a great asset in getting case studies and personal contacts from a variety of professionals working on projects dealing with deconstruction.
- **Charles J. Kibert** – Professor at M.E. Rinker, Sr. School of Building Construction and the author of “Sustainable Construction Green Building Design and Delivery.” Professor Kibert has a large amount of information on sustainable design and will be an excellent resource for putting me in touch with the proper people at the Robert Gordon University in Aberdeen.

Norway/Sweden –

- **Lisa MacKinnon** – Policy Director of 1000 Friends of Wisconsin – Tour coordinator for Sustainable Sweden Tours. Knows of a number of different projects and personnel for sustainable building.
- **Mats Williamson** – President for Skanska Sweden. He is in contact with a large number of deconstruction and construction projects throughout Sweden.
- **Filip Henley** – Translator of the book “The Ecology of Building Materials,” by Bjorn Berge. Mr. Henley is a great person to interview to better understand many benefits to alternative building materials. He will elaborate on how to design and manufacture reusable building materials.
- **Hans Norgren** – Project Leader at MKB Fastighets, a sustainable construction and renovation company

France –

- **Bastien Allanic** – Former roommate and longtime friend native to France. Bastien will be an asset when communicating in French to personnel and will assist me with the best practices for getting around. Bastien is a student at the University of Technology of Compiègne and will be able to set up personal interviews with professors in engineering and engineering systems.
- **Dominique Seller** – Charge de mission for Arcne. This architectural firm strictly focuses on High Environmental Quality buildings and Sustainable Urban Renewal including the durability of construction materials used in their design. They provide free informational sessions to heighten the awareness of Eco Buildings.
- **Pascal Gontier** – Professor at Ecole Nationale Supérieure D’architecture in Paris. A European Master in Architecture and Sustainable Development, Professor Gontier will give me insight as to what he looks for when choosing construction materials when designing for deconstruction. Professor Gontier is a great contact in introducing me to other architects and case studies.

Canada

- **Cam Brewet** – Canada Program Manager for Canada Green Council. She is a great resource for current and past projects looking for LEED Certification. I will receive project locations and architects who design for deconstruction and may potentially hold a temporary internship position through the Canadian Green Building Council.
- **Ben Ramos** – Executive Assistant at Recycling Council of British Columbia. Mr Ramos will be my motherboard contact to numerous construction and deconstruction companies. He will show me how the company has been

tracking British Columbia's environmental footprint and ways they are shooting for their zero waste goal.

- **Malcolm and Jessica** – Spokes personnel for Encorp Pacific in Canada. Both of these individuals will be able to discuss the effectiveness for having an online source to buy and sell used construction materials and equipment. I will be able to better understand which materials are in demand and hold the greatest value and reasons why.

United States –

- **Building Materials Reuse Association (BMRA)** – Allow me to better understand the deconstruction process and the feasibilities of it throughout the entire United States.
- **Joe Karten and Mary Evens** – Former Regnier Traveling Fellowship winners who have given me great advice throughout the traveling fellowship proposal process.
- **Jack L. Fischer, AIA and Secretary for the Wisconsin Department of Commerce** – has thirty years experience in Architecture, International consulting and development. Mr. Fischer is passionate about sustainable design and has contacts in Finland, Sweden, Norway as well as some other countries in Western Europe. He is interested in putting me in touch with the right people so I can get the information I need.

Resources To Be Purchased --

- **CIRIA's Designing for Deconstruction** – addresses opportunities for maximizing the use of components and recycling of materials when a building is wholly or partially deconstructed. The guide also reviews the processes by which buildings are demolished and can be deconstructed, the opportunities for reusing components and recycling materials, and current expenses of deconstruction.
- **The Ecology Of Building Materials** – by Bjorn Berge, this book is more than an introduction to the ideas of sustainability. There is a clear and scientific case for many changes from how we build and which materials we choose to build with. Each section gives an overview with just enough history, technical understanding and chemistry to give the reader the background and real understanding of the issues and choices. The book is broken down into three sections: issues of material production; energy and pollution; and tables with quantifiable environmental effects of each material.
- **ENR's Top 200 International Design Firms** – July 23, 2007 – A great resource to get information on the main design firms in the locations desired.

- **A Report on the Feasibility of Deconstruction: An Investigation of Deconstruction Activity in Four Cities** – This book addresses the methodology of deconstruction and includes the recommended actions for various types of governments. One of the cities listed is Milwaukee Wisconsin where I will be able to contact members from organizations on the success of project deconstruction. ALREADY PURCHASED!
- **A Guide to Deconstruction** – An overview of deconstruction with a focus on *Community Development Opportunities* complete with deconstruction project profiles and case studies. ALREADY PURCHASED!

INTERVIEW QUESTIONS TO THE ARCHITECT

1. What recycled materials should be considered for designing for deconstruction and why?
2. How can the number of construction materials be reduced yet maintain its aesthetic appeal?
3. Which hazardous materials should be avoided for designing for deconstruction?
4. How are the construction materials identified throughout the entire building life?
5. What type of information is important to record for designing for deconstruction?
6. Are there ways of standardizing pieces identified?
7. What is the best practice in creating an open building that has interchangeable parts?
8. What ways can be implemented to provide access to all building components?
9. What concerns are addressed when designing building component sizes for deconstruction?
10. How are the construction materials handled differently?
11. How do you reduce the number of connections of a building?
12. What technologies are used for joints and connectors in order to withstand repeated assembly and disassembly?
13. Is the weight of materials a concern when designing for deconstruction?
14. How do you identify the stages and points of disassembly?

15. Who retains the information on the building assembly process in order to deconstruct?
16. Is weather a consideration for designing for deconstruction?
17. Which materials ought not to be considered for recycling and why?
18. If an owner wants green roofs but also would like to design for deconstruction, what steps need to be considered?
19. Are manufactures interested in purchasing back materials after a buildings use?

INTERVIEW QUESTIONS TO THE CONSTRUCTION MANAGER

1. Besides steel erection, when are chemical connections used?
2. Which practices ought to be considered for offsite assembly technologies and standard onsite building practices?
3. What are the differences in the way construction materials are handled during the construction phase and the deconstruction phase? How would you like to see this change?
4. Where is first begin the disassembly stages of a building?
5. How long does it take for steel to be constructed by bolt connections verses welding? What about deconstruction?
6. How do you identify the stages and points of disassembly?
7. Which areas are best used for cast in place verses precast concrete?
8. What mortar mix is recommended to best preserve brick and CMU?
9. What steps are taken in handling construction material during the deconstruction phase?
10. How does winter effect deconstruction? Rain? Wind?
11. How can materials like concrete, gypsum board, wood and be used for a new project?
12. Which materials ought not to be considered for recycling and why?

Yr	From	CODE	Date	To:	CODE	Stay Dur.	Cost	Reference
Air Travel Expenses								
One	Chicago, IL	ORD	9/15/2008	Edinburgh, G.B	EDI	4 Months	\$ 435.55	Travelocity
One	Edinburgh, G.B.	EDI	1/15/2009	Stockholm, Sweden	STO	2 Weeks	\$ 234.95	Travelocity
One	Stockholm, Sweden	STO	2/2/2009	Oslo, Norway	OSL	1 Week	\$ 135.55	Travelocity
One	Oslo, Norway	OSL	2/10/2009	Paris, France	PAR	3 Weeks	\$ 225.05	Travelocity
One	Paris, France	PAR	3/1/2009	Vancouver, B.C.	YVR	1 Month	\$ 1,575.25	Travelocity
One	Vancouver, B.C.	YVR	4/1/2009	Chicago, IL	ORD		\$ 260.88	Travelocity
Total Duration 6 Months and 2 Weeks								
Train Expenses								
UNITED KINGDOM								
*	BritRail Scottish Freedom Pass			Travel only around Scotland (8 days)			\$ 171.47	BritRail
*	BritRail London Plus Pass			Travel UK and in Ireland (10 days)			\$ 367.63	BritRail
Winter Discounts for travel begin on November 1 thru February 28.								
NORWAY								
*	Norway Youth Pass			Travel anywhere for (4 days)			\$ 225.00	Rail Europe
FRANCE								
*	France Youth Pass			Travel anywhere for (10 days)			\$ 424.00	Rail Europe
CANADA								
*	British Columbia Trip			Round trip in British Columbia			\$ 428.24	VIA
*	Special discounts for ISC card							
Bike Expenses								
	Bike Hire - Edinburgh		\$ 101.72	Per Week	# wks	3	\$ 305.15	BikeTrax
	Bike Rental - Vancouver		\$ 37.74	Per Day	# day	7	\$ 264.18	Spokes Bicycle Rentals
	Food Expenses		\$ 20.00	Per Day	# day	194	\$ 3,880.00	
Reference Expenses								
	The Ecology of Building Materials Book - Bjorn Berge						\$ 60.00	
	CIRIA's Designing for Deconstruction Book						\$ 90.00	
	Sustainable Sweden One Week Tour						\$ 3,600.00	
Education Expense								
Housing Expenses								
RENT								
	Edinburgh Rent		\$ 200.00	Per Week	# wks	16	\$ 3,200.00	Discuss w/ Roommates
HOSTELS								
	UK		\$ 37.00	Per Day	# day	7	\$ 259.00	Hostelworld.com
	Sweden		\$ 17.00	Per Day	# day	14	\$ 238.00	Hostelworld.com
	Norway		\$ 26.00	Per Day	# day	7	\$ 182.00	Hostelworld.com
	Canada		\$ 25.00	Per Day	# day	30	\$ 750.00	Hostelworld.com
	France		\$ 29.00	Per Day	# day	7	\$ 203.00	Hostelworld.com
For lengths longer than 2 weeks, looking to consider staying in local dormitories								
	Communication Expense		\$ 10.00	For 6 hours	# hrs	194	\$ 323.33	Skype
	Incidentals Expense						\$ 1,000.00	
	Travel/Health Insurance Expense						\$ 500.00	
	Emergency Healthcare Expense						\$ 1,000.00	
GRAND TOTAL							\$ 20,338.23	

Euro to USD 1.4531 as of 12/28/2007