



University of Oregon

SOLAR

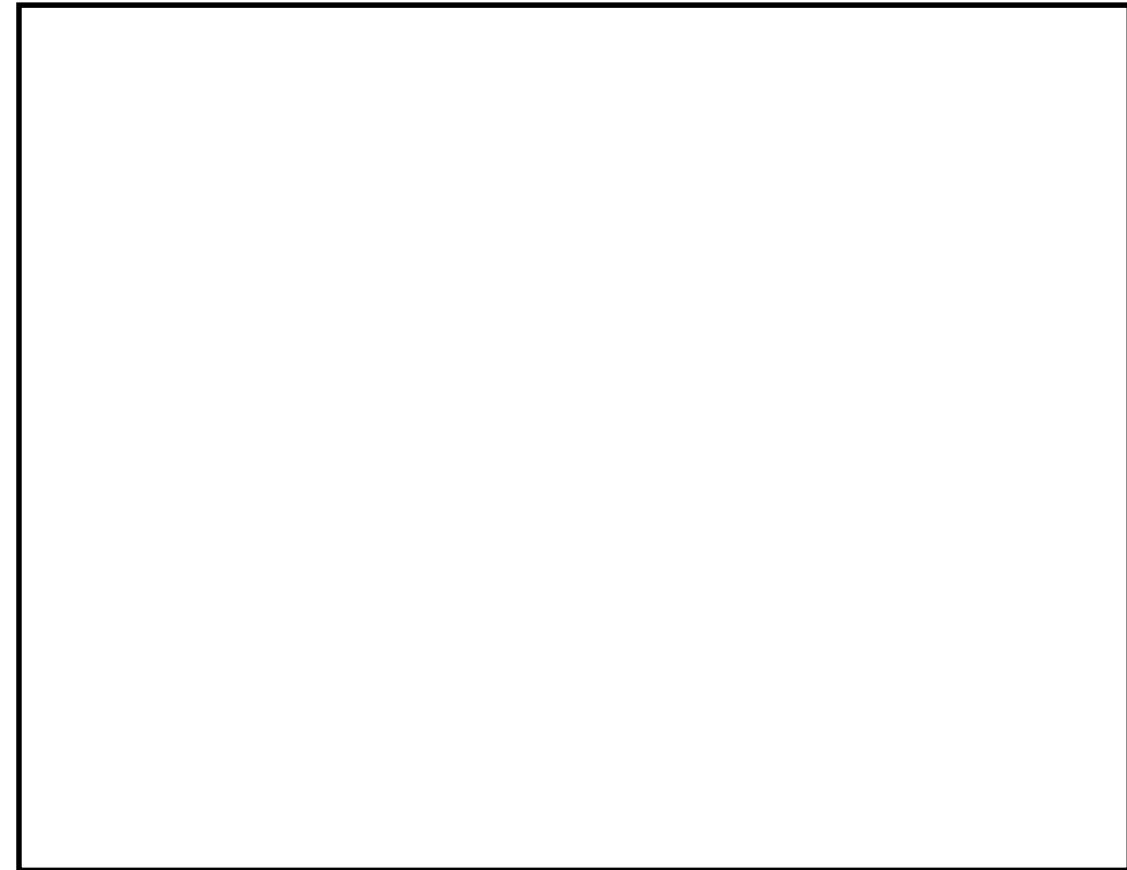
INCIDENTS

The Newsletter of the Solar Information Center

Vol. 7 No. 3

SPRING 1997

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Implementation of ISTEA—Bicycle Enhancements By Ron Milam

Introduction

Our modes of transportation affect the environment in different ways. For personal transportation, the bicycle fits into a larger “livable community”. In 1991, a progressive vision for transportation planning entered the national arena: the Intermodal Surface Transportation Efficiency Act (ISTEA, pronounced “ice tea”). ISTEA deals with every aspect of American transportation. It gave local metropolitan planning agencies (MPO’s) greater flexibility, created space for public participation, promoted long range plans and addressed the issue of environmental impacts of transportation. “ISTEA is the first federal transportation law that explicitly acknowledges bicycling and walking as viable modes of transportation”.¹



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The Solar Page

What is the Solar Information Center?

It is a student run organization sponsored by the ASUO and EWEB. The purpose of the center is to serve as a research, education, and information center on solar energy and alternative energies, and their applications in architecture and technology.

One of its vital functions is to sponsor a lecture series on local, regional and global energy issues to promote a higher awareness toward conservation and renewable energy. The center also provides an in-house information source of books, periodicals, abstracts, proceedings, topic-files, product-files and a World Wide Web site.

University of Oregon Environmental Technology Center

The Environmental Technology Center (ETC) is a project that the Solar Information Center has been working on for two years. We have since written several grants and received numerous letters of support from faculty in Environmental Studies, PPPM and Architecture. The vision is grand as would be the impact of having this type of facility on the University of Oregon campus.

Environmental interest, program requirements, and research programs of the Environmental Studies, Architecture, Landscape Architecture, and Physics department, in addition to many other campus organizations including the The Institute for a Sustainable Environment (ISE), Center for Housing Innovation, the Solar Information Center, HOPES, MRC and others, have grown and expanded dramatically over the past few years and have resulted in the fragmentation and taxing of our currently existing facilities. There is a strong need to centralize and bring together portions of these organizations in order to better utilize existing resources and provide for clear areas of growth in Environmental Research at the University of Oregon. The ETC will provide a place that will encourage cross-disciplinary environmental research, education, and public service.

This facility is intended to be a showcase of sustainable design, utilizing materials that are low in embodied energy and non-toxic in nature (strawbale construction is a possibility), while incorporating the latest technologies in passive and active solar design to produce a structure that is attractive, functional and cost and energy efficient. The construction or renovation of a building of modest size could be accomplished utilizing the design build programs of architecture and landscape architecture. Monitoring the performance of this 'green building' for its energy performance in the northwest and the performance of alternative methods of construction would be part of the ongoing activities at the ETC.

We continue to work on this project and could use more help. If you are interested in this project, please contact the Solar Information Center. ■

SOLAR INFORMATION CENTER

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**SPECIAL THANKS
TO EWEB FOR
THEIR CONTINUED
SUPPORT!**

Building with Agriculture Waste

By Russell Lee Weiser

SUMMARY

In recent years the cost of wood for construction of houses has increased as the availability of timber resources declines and the rate of harvest decreases. Off-gassing of harmful chemicals from other construction materials has also become a cause for concern. The search for alternative construction materials has led to a growing interest in using straw as a building material. Houses made of straw bales can be produced relatively inexpensively (\$58/ft²), with a high insulating value (R = 56.5)— according to a DOE study, "House of Straw--Straw Bale Construction Comes of Age". The houses built from this renewable resource are also quiet and more fire resistant than conventional stud wall construction.

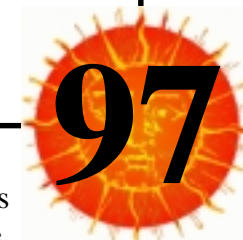
Oregon has an abundant straw resource. There is an average of one million tons of grass seed straw produced in the Willamette Valley each year as a by-product of the grass seed industry. Of the one million tons of straw produced, 20% is burned, 20% is chopped and tilled back into the soil, and 60% is baled and utilized. Just the straw that is burned each year could be used to build approximately thirteen thousand houses averaging 2000 ft². The potential for straw to become a familiar method of construction seems high, especially when we consider that there are twice as many acres in wheat production in Oregon as there are in grass seed production.

The typical three-string ryegrass straw bale is about two feet wide, two feet high, four feet long, and weighs 110 pounds. This dimension bale was developed for ease of handling in the field. If straw is to be used more regularly in construction it seems appropriate to investigate the best configuration for building construction. One of the drawbacks to typical straw bale construction is that a load bearing straw bale structure is difficult to get over one-story tall and be

structurally sound. In addition, an R-value of 50-55, is not necessary in this climate, so a thinner wall may be able to provide an acceptable R-value while conserving the resource.

The outcome of the DOE survey suggests two possible methods of making structural walls of grass seed straw. The first method would be to make a straw core stressed-skin panel that is load bearing. A company in Iowa (Agriboard Industries) is currently producing such a product and claims to have an R-value of 3.4 per inch in 8-inch thick load bearing panels. The straw is heated to 390 degrees Fahrenheit under pressure and stays in that configuration without a binding agent. OSB panels are then applied to make the skin. The second method would be to repack the bales more densely and uniformly so they could be used for load bearing structures. One complaint about straw bales from the field is their lack of uniformity and settlement, after being put in place. Denser bales could be made more uniformly, reduce settling and possibly be load bearing. According to Stan Steffan (custom bale maker from Salem, Oregon) bales could be repacked in a central location from the large round bales that are less expensive to handle and transport. Repacked bales could also be made to order for a particular house, i.e. half bales for edges and pre-drilled holes for rebar reinforcement. Bale density can be specified with some precision in the range of 6 to 30 psi. Most bales currently available are near a density of eight to ten psi. It would be valuable to know what the ideal density is for load bearing and insulation value. If either of these two methods is to be used, a significant amount of testing would be

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The Bull, near Wall Street

On a recent trip to New York, through the chill of winter light, I visited Wall Street. I wanted to see up close and personal our famed money circus that greased the wheels of capitalism in these United States. I had always imagined the street itself as its own entity— its own breathing lung of power and influence— somewhere mysterious, untouchable by my small hand. As I approached it, walking up Broadway, turning the corner, envisioning it lit up in Las Vegas snazz, I was amazed to find the darkest, coldest, narrowest street in, it seemed, all of New York. This was it? This was the ‘entity’ that dictated our economic success? This alley way of neck-wrenching skyscrapers? I felt out of place as a human. This was not a place where humans walked. I shrank into miniscule in the shadow of that deep canyon, and rushed to join the constant flow of pedestrians at the next intersection.

I turned back around to confront it from another angle: The same, except from that way, Wall Street runs directly into the steeple of Trinity Church and its pioneer cemetery. The builders of that sanctuary couldn’t have conceived that they would one day be framed by so much concrete and steel.

Surviving Wall Street has strengthened my humble non-materialism. My

reaction to being there made me realize I do not speak the same language as those who help to run it. I picture them opening their mouths and a long scroll of dollar signs, commas, and decimals stream out to formulate business strategies. To me, a foreign tongue of money, growth, and bottom-lines. Some may understand it as How to run their factory, Who is today’s top-dollar corporation, or What is in fashion. I am learning to translate it as increased pollution from yet more cars, urban sprawl instead of urban density, and who is elected into office.

Yet, despite these clashing language systems, I somehow end up putting MY money where THEIR mouth is: Everytime I turn on the television and am sold on a valueless product, or buy bleached toilet paper, or skip the town meeting, or not vote, I am fueling the demand for consumerism and assimilating to their bought and sold culture. I have too often been distracted by believing that I need what they are selling.

Looking up at those sky-rocketing structures glooming over Wall Street, I felt disappointment. I was disappointed in myself for not being more responsible for where my dollars were headed, and for not being more responsive when prisons opened and schools closed. Disappointed also in others, who believe freedom and democracy mean they can fire a gun at random to make their grievances heard, or choose to destroy their bodies with carcinogens to delay reality. We are privileged in this country to have the freedom to live life well, to take part in what happens in our communities. Too often, we forget that we are protected as citizens to speak out and make our voices heard. That is democracy; Not the money and corporate clout it took to build a new toxic electronics plant, or to pave over wetlands for more parking, or to elect politicians who ignore our societal needs. These are not the choices

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of the conscientious, well-informed majority of us, but rather the decisions of a few gargantuan companies who think in short-term growth, not long-term sustainability.

Around the corner was a long line of tourists anxious to file into the carnival of the stock exchange. They too, came all this way hoping to unveil the mystery behind The Market. I hoped they might see the wizard behind the curtain; Fearless like a bull in manipulating the populace, but suddenly revealed as vulnerable, a slave to the power of profits. I have finally seen past the bull’s facade, and I know that its system of money only has as much influence as I let it have over my life. I, the consumer, can take it by the horns and teach it new language of democracy; One that answers ecological, cultural, and moral questions, that manages our urban centers on a human scale, that actively represents the politics of all people. I walked back towards the narrow corridor of Wall Street, turned the corner to spy a patch of sunlight on the pioneer cemetery beyond, and instead of running through, this time, I marched.

.....
For effective change from a money-based culture towards one that honestly advocates planetary and social sustainability, support real Campaign Finance Reform and take the dollar signs out of decision-making. Keeping big money out of politics will require a constitutional amendment to publicly fund all political races in the U.S. For more information, please contact: Harry Lonsdale, Campaign for Democracy, 1420 NE Sharkey Terrace, Bend OR 97701. Phone: (541) 388-7307 Fax: (541) 389-4819. Better yet, write your own commentary, send it to friends and family, a local radio station, a newsletter, an opinion page, or simply urge others to get involved. We CAN make our voices heard. ■

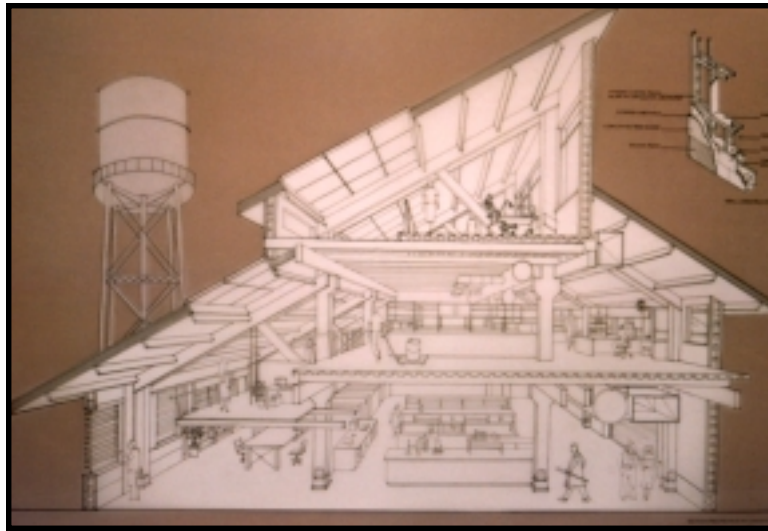
necessary, both in the structural stability and R-value.

Straw is also being used by several companies around the country to make a thinner non-structural paneling similar to particle board. Meadowood Industries in Albany, Oregon makes a decorative paneling from ryegrass straw (pictured). This process uses pressure and an isocyanate binder (MDI) that is non-offgassing. One straw board plant in Wahpeton, ND makes a furniture grade board of wheat (Prime Board) that is favored over particle board by cabinet-makers (Environmental Building News, March 1997, Volume 6, Number 3).



Ryegrass straw board

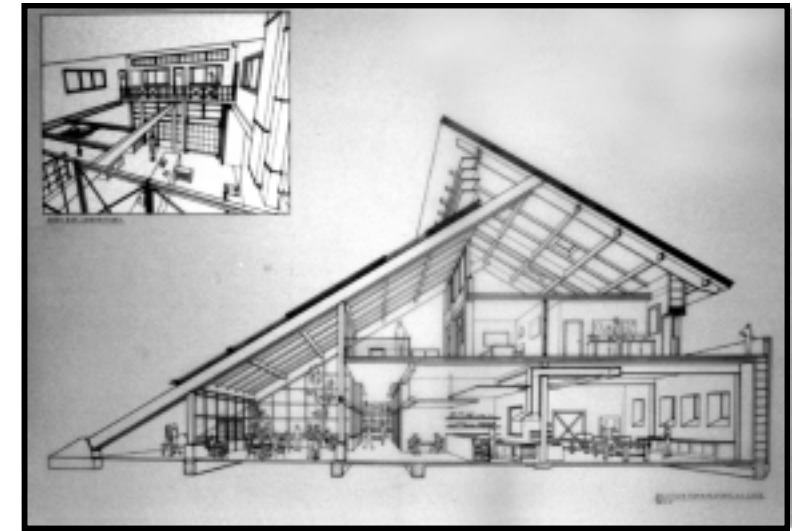
In conclusion, the potential for straw to be used as a building material seems great. Straw bales are currently the most common form used in construction. Several alternative forms of straw hold promise for improving on the efficiency of straw fiber used in construction. With the growing need for alternative building materials and tighter restrictions being imposed on the burning of straw, it seems likely that the use of straw will increase. However, besides the DOE study, very little solid research is available on the characteristics of different types of straw and straw products. A comprehensive study of straw products would be timely and useful for this growing industry. ■



Solar and Sustainable Design Showcase

Winter 1997

The Solar and Sustainable Design Showcase is a quarterly event that encourages and recognizes the pursuit of sustainability in the University of Oregon School of Architecture and Allied Arts. These projects help to educate through the dissemination of ideas in Solar Incidents and on the World Wide Web. The complete works are on display in the Hearsh, Lawrence Hall through April 14th. Submissions for Spring Quarter are due June 8th.



1.

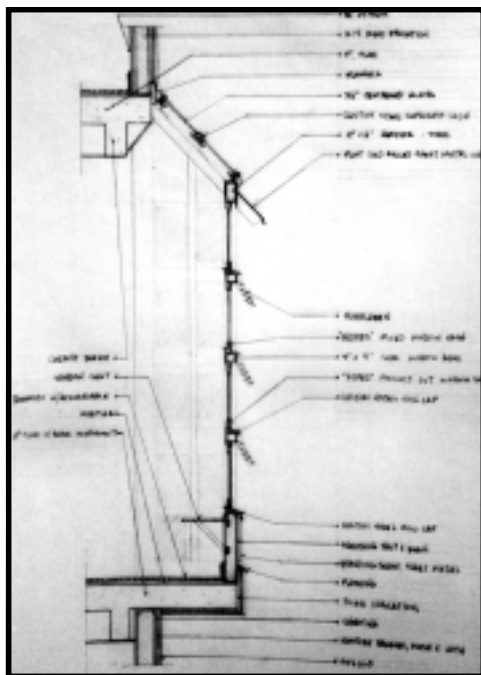
1. Oregon Resource Center by Stefan Wynn: The ORC is a 50,000 sq.Ft facility dedicated to the research, development and demonstration of sustainable technologies and practices. The consideration of the siting, form and materials of this building was integral to this mission. The building orientation maximizes solar access for interior and exterior spaces while also controlling gains. The form lends itself to solar collection, day lighting, and natural ventilation. For the selection of building materials I considered embodied energy, durability, toxicity and future reuse.

2. Oregon Resource Center by Colin Brandt: The Oregon Resource Center is a place where ideas are born. Comprised of laboratories, classrooms, office space and conference rooms, it creates an environment in which diverse members of the community can come together and work towards the economic and ecological revitalization of our bioregion. The design promotes human interaction, both formal and informal, as well as a clear visual connection between the built environment and the natural one. This connection is reinforced by elements such as the living machine (biological purification of black water), photovoltaic and solar hot water panels and use of available daylight and passive cooling techniques such that the building itself becomes an expression of the values being promoted.

3. Oriel Window Sunshades by Hannah Wear: This south side window seat has an integrated sunshade on the exterior. The shading devices were designed to allow sun penetration in the winter to heat the high mass recycled terrazzo floor. The mass stores the heat for release during the evening. The high sun angle of the summer sun enables the sun to be rejected during the summer months to maintain a cool interior.

4. The Millenia House by Therese Peffer: Millenia House highlights the use of renewable energy and "soft", natural building technologies that enhance people's enjoyment of their homes. As such, Millenia House is comfortably and conveniently powered by solar energy, providing direct space- and water-heating as well as abundant electrical power. It also strives to create homes that satisfy people's varied needs without compromising the social and environmental health of our neighborhoods.

5.



6.



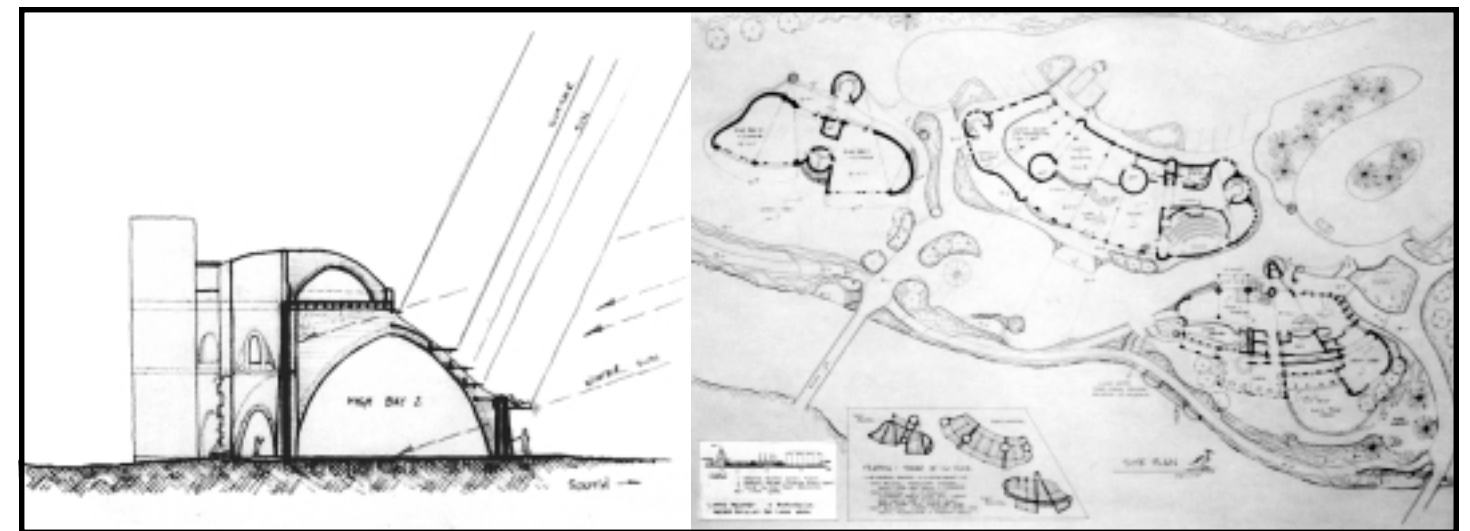
2.

5. Adjustable Tilt Photovoltaic Sunshade by Ross Leventhal: These drawings show the design for a sunshade that not only protects the projecting Oriel window from overheating due to sun penetration in summer, but raises in the winter to achieve space heating with direct gain during the winter. The added function of each horizontal element in the system, housing a strip of photovoltaic cells, enables electricity generation. The individual panels are computer controlled to tilt with the changing sun angle of the different seasons, to maximize insolation.

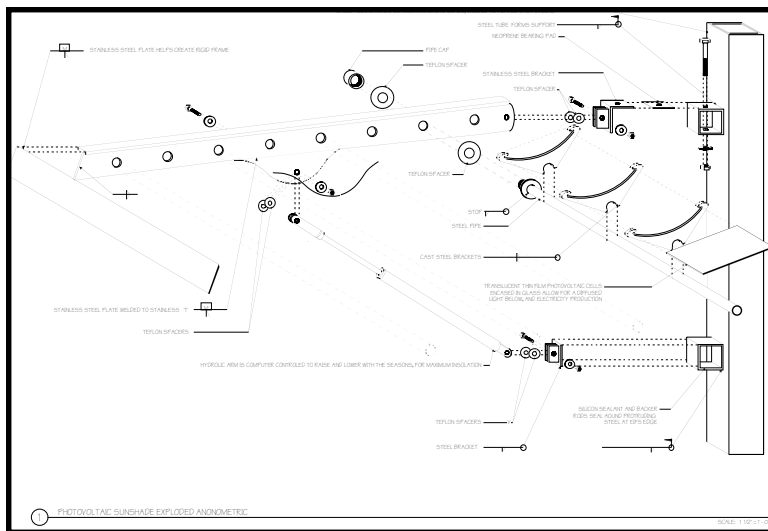
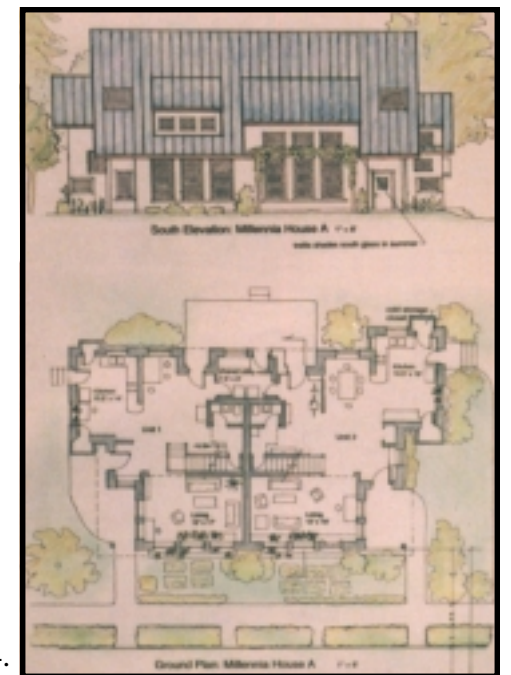
6. Cape Blanco by Chuck Roberts: I propose the beacon of Cape Blanco reincarnate, still guide but this time as a navigational aid towards environmental awareness. The Cape Blanco Interpretive Center, given its spectacular natural location, native spiritual value and high visitation, is designed to function as a modern example of environmental balance once practiced by the indigenous people of the Northwest. The systems are designed for zero negative environmental impact. The required water is caught from the roof; the electricity will be wind generated but still hooked to the grid to bypass the need for storage batteries; the composting toilets are "Clivus Multrum" type. The storm watch tower is an interactive interpretive display equipped with both ship and environment monitoring instrumentation. One might scan the radar for marine traffic or listen to ship communication over a radio. Also, through electronic monitoring, the power consumption of the center or the production of the turbines could be read.

7. The Heron Institute: A Bio-Regional Re-Source Center by Valerie Wedel: The Heron Institute is a community center dedicated to emerging cultures of sustainability. It offers a vision of architecture's potential. It seeks to unite people of diverse generations and skills, learning from and in harmony with nature. This institute manifests in bioregionally sustainable materials, labor, and energy. Masonry construction of locally-made bricks, locally manufactured glu-lams, hempboard decking instead of plywood, recycled materials and non-toxic finishes all contribute to realizing this vision.

7.



4.



The major legislation within ISTEA dealing with bicycles (out of 14) is a mandated program called Transportation Enhancements. It contains approximately 2.6 billion dollars over a six year period (just over 1% of the \$155 billion in ISTEA) to fund intermodal transportation systems. Approximately 52% funds bicycle related projects.² Specifically, they are:

- Provision of facilities for pedestrians and bicycles.
- Preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian or bicycle trails).

Enhancements are a match program, with the federal government supporting 80% of project costs.³ A number of successful projects have materialized, demonstrating a clear benefit to local communities. Yet, five years after the legislation was approved, only 28% of total funds allocated have been reimbursed for completed projects.⁴

Since ISTEA reauthorization is heating up in Congress, its progress appears weekly in major newspapers. To bring you up to date, the President has submitted a plan. Clinton's bill released on March 13, dubbed the National Economic Crossroads Transportation Efficiency Act (NEXTEA), would increase spending for the "Transportation Enhancements" program (Phillips/Reid, WASH. POST). Lobbyists are either revving their engines or peddling hard to sway the debate.

The press focuses mostly on whether or not it will be funded. However, success of the program depends on much more than funding. What's lacking in the press is an account of the policy's evolution after implementation and a survey of potential policy improvements.

Overcoming Barriers

Because Enhancements are a new program, a number of obstacles prevent timely implementation of the program. Some have been rectified through the National Highway System (NHS) Designation Act of 1995.

Technical Barriers

The actual enhancement process contains a number of technical requirements. Each stage requires expertise knowledge from the Metropolitan Planning Organization. Effectively moving from one stage to another proved to be difficult in inexperienced localities. Common were misunderstandings of components within Enhancements, especially in design, planning and construction of projects. Lack of Bicycle knowledge and coping with federal regulations slowed initial projects down. Greater education and experience partially solved this problem.

All states in the FHWA report mentioned environmental regulations (NEPA) as barriers. With the NHS Act of 1995, Enhancement projects now fall under "categorical exclusions", which exempts them from a rigorous NEPA project evaluation, speeding up the process.⁵

Economic Barriers

Financing even twenty percent of the project costs has been a barrier. In Oregon, measure 5 has limited funds for local government. Initially, the 20% match had to come from the project sponsor. As of 1995, with the National Highway Designation Act, a wider source of funding is available.

Administrative Barriers

Project sponsors were left on their own to deal with implementation problems, without any major assistance from the national or state level. A source for this type of information now exists on the national level: the National Transportation Enhancement

Clearinghouse, established in 1995. They hold a large library, and compile data on enhancement progress throughout the nation.

Political Barriers

Resistance to Enhancements occurred at various governmental levels. Many viewed them as a frivolous mandate from Washington D.C. Because of this, Enhancements earned a lower place on the list of transportation priorities. Political barriers should ease for some who eventually see the varied social, environmental and economic benefits of the program, which comes from experience. However, more will be required to convince people who perceive harm from Enhancement success.



General Overview of Barriers that need to be addressed.

ISTEA Enhancements still require improvements. Following are a number of persisting problems and suggested solutions. Through reauthorization, an opportunity presents itself to improve Enhancement's scope, effectiveness and efficiency of the Enhancements program, besides just giving more money to it.

Technical Barriers and Solutions

One manifestation of the novelty of enhancement projects is an inaccuracy in estimating the project's cost beforehand. For particular state issues, individual Departments of transportation ought to provide clear expectations for TE projects. Part of the expectations process would educate

project sponsors on potential barriers to implementation, and give them access to problem-solving resources. A memo is circulating through the Oregon Department of Transportation (ODOT) that addresses the low cost estimate issue, among other policy improvements. It suggests that project sponsors learn all the details before they estimate the costs.

If the laws were clarified, many troubles would be avoided. The language written into the law is vague, confusing potential project sponsors. Clarifying the law gives more certainty as to what is allowable, while sacrificing a little flexibility.

The ultimate clarification needed is a deadline for implementation. A deadline serves as an incentive to move projects along in a timely manner. A precise deadline must have flexibility, however.

Administrative Barriers and Solutions

Very little is spent for a statewide staff position to coordinate projects once they have been programmed. Only a half-time Enhancement State Coordinator exists in Oregon. ODOT created it in September of 1996, but has not provided the resources necessary to make the position effective.

If it were made into a full time position it would address a number of administrative issues. The position would do everything necessary to ensure a timely implementation of projects. Statewide coordination provides a vital link to successful local projects.

For each and every project, a multitude of tasks are performed. Once selected, project sponsors are required to individually hire the labor necessary to complete these projects. This translates into the same overhead costs ranging from \$10,000 to \$15,000. To save money, an alternative is for smaller projects within the same region to share overhead costs.



SOLAR INFORMATION CENTER Spring Lecture Series & Events Calendar

These events are free and open to the public

“Environmental Harmonics”

by Lawrence Schechter

Sat, April 12 , 12:00 - 1:00 pm, room **206 Lawrence Hall**, U of O

At HOPES third annual Eco-Design Arts Conference

Lawrence Schechter, Architect, is a leading proponent of sustainable architecture. His firm, Sustainable Architecture, is located in Ashland, Oregon and specializes in architectural and planning services based on principles that sustain the natural world. His focus on advances in design and construction within a holistic model, Environmental Harmonics, blend both visionary and practical skills to serve the growth of conscious architecture.

Renewable Energy Fair

Friday, April 25, 10 am - 5 pm, **Erb Memorial Union Courtyard**, U of O

The Renewable Energy Fair is a yearly event that is part of the University of Oregon’s Earth Week celebrations. Come see the educational displays concerning energy alternatives and their applications in architecture and technology as well as community solutions for a more sustainable future.

“The Greening of Planet Earth”

Video Brown Bag

Wed, April 30, 12:00 - 1:00 pm, room **206 Lawrence Hall**, U of O

This video was created by a consortium of oil and gas producers. This humorous production tries to convince us that the burning of fossil fuels is actually beneficial to the planet and humans. The warming of the planet, thanks to the greenhouse effect, will supposedly create more food. Have these oil producers not heard of desertification? Frankly, we prefer a greenhouse helping to passively heat our home and grow vegetables in winter.

“Overview of Solar Electric Technologies and EWEB solar energy activities.”

by Stephen Still

Thursday, May 8, 7:30 pm, room **177 Lawrence Hall**, U of O

Steve Still is an Energy Management Specialist for Eugene Water & Electric Board (EWEB), and coordinates EWEB’s solar energy activities. He will present an overview of technologies used to generate electricity from solar energy, and EWEB’s solar activities, including THE BRIGHT WAY TO HEAT WATER™ solar water heater program and the Regional Solar Radiation Data Monitoring Project.

“Diet For a New America - Your Health, Your Planet”

Video Brown Bag with Jan Spencer of EarthSave

Wed, May 14 , 12:00 - 1:00 pm, room **206 Lawrence Hall**, U of O

A 30 minute video summarizing the book by Jon Robbins, hosts a journey into the great American food machine and connects the dots to reveal the tremendous environmental and health consequences of a diet based on animal products. 30 minutes of discussion to follow with Jan Spencer a local Earth Save healthy food activist, concerning local food activities and global trends and how they relate to resource conservation.

For more information, please contact us at **541-346-3696**



Bicycle Enhancements

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Scientific Barriers and Solutions

In America, traffic engineers lack hard data on bicycle statistics. For example, they are not totally convinced more lanes lead to higher levels of bicycling. More research into the subject provides them with tools to solve problems. Inspiration can come from Denmark, where a long research tradition exists looking into bicycle behavior.

Political Barriers and Solutions

As of now, Enhancements are just mandatory set-asides. Over time, Enhancements should become standard in transportation planning.

The largest political barrier may be the reauthorization itself. There exists a large and powerful contingency that believes enhancement related projects waste precious highway dollars.⁶ The AAA and AASHTO (American Association of State Highway and Transportation Officials) head up the anti-enhancement lobbying effort. To them, ISTEA represents unnecessary government regulation and money. They would much rather see the money invested in improving highways.⁷ They would like to rescind mandated enhancements, and offer it as an alternative. If this were to occur, significantly less projects would be built.

Hank Dittmar, director of the Surface Transportation Policy Project, a coalition of environmental groups for alternative transportation said, "We were very pleased with the overall message that the president had-- that transportation is in large part about the environment"⁸. Even with presidential support, they know they must lobby hard.

Much of the outcome depends on the will of American citizens, and what they see as the future for transportation, and what you communicate to your congress person.

Conclusion: New Ideas take time

Changing transportation policy challenges American culture. Americans still have a love affair with the car, and breaking that lifestyle is difficult. There are many mythical preconceptions about bicycle riding in this country. Once bicycle riding is redefined into a respectable mode of transportation, many more will use it on a regular basis. If enhancements are placed within the political agenda, projects will materialize. High expectations backed up with hard work lead to concrete results.

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This is an abstract of Ron's thesis. The complete report is available on our web site or in the Solar Information Center. We also have a file of many of the resources used in this report for further study.

1. NTEC, June 1996 ISTEA and Trails, Enhancement funding for Bicycling and Walking , June 1996, Rails to Trails Conservancy. pp. 1
2. The National Transportation Enhancements Clearinghouse (NTEC), Oct. 1996. "ISTEA Transportation Enhancements: Summary of Nationwide Spending" pp. 5
3. USDOT 12/92. "Bicycle and Pedestrian Provisions" Section 1033, pp. 7
4. ibid. pp. 2
5. ibid. pp. 1-2
6. Capital Resource Center, February 1996. "The Transportation Lobby: The Politics of Highway and Transit: Social Engineers Compete with Special Interests in Drive for Highway Dollars" <http://www.nationalreview.com/crc/trends/ot-0296.html>
7. ibid.
8. GREENWIRE, March 13, 1997 ■



CALENDAR

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SOLAR INFORMATION CENTER

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