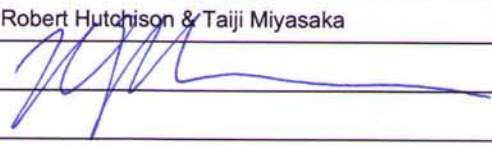


**Society for Industrial Archeology - Industrial Heritage Preservation Grant  
Grant Application Cover Sheet**

Date of application:	1. 03/01/2011	Title of Grant:	2. Documentation of Timber Grain Elevators & Silos of the Palouse		
3. Robert Hutchison & Taiji Miyasaka		4. (206) 380-7546 (Robert)		5. rob@hutchmaul.com (Robert)	
<i>Name of Principal Researcher (Send PDF of CV with this application)</i>		<i>Phone</i>		<i>E-mail</i>	
6. 4010 Whitman Ave N		7. Seattle, WA 98103			
<i>Address</i>		<i>City, State, Zip</i>			
8.		9.		10.	
<i>Name of Project Sponsor (Organization and contact name) (Send PDF of letters of sponsorship or collaboration)</i>		<i>Phone</i>		<i>E-mail</i>	
11.		12.		13.	
<i>Address</i>		<i>City, State, Zip</i>		<i>Tax ID</i>	
15. See attached pdfs		16.		17.	
<i>Name of Project Co-Sponsor (s) (Send PDF of letters of sponsorship or collaboration)</i>		<i>Phone</i>		<i>E-mail</i>	
18.		19.		20.	
<i>Address</i>		<i>City, State, Zip</i>		<i>Tax ID</i>	
22. Taiji Miyasaka		23. (509) 432-9847		24. tmiyasaka@acm.wsu.edu	
<i>Name of person or organization receiving the check</i>		<i>Phone</i>		<i>E-mail</i>	
25. 310 SE Crestview		26. Pullman, WA 99163			
<i>Address</i>		<i>City, State, Zip</i>			
27. Brief Description of Project (Send full project summary & application narrative in PDF)					
<p>We are seeking funding to support our ongoing project that involves the documentation of abandoned and/or partially dismantled grain elevators and silos located throughout the Palouse region of southeastern Washington State. We estimate that there are approximately 100 of these timber grain structures still remaining. Due to maintenance and fire concerns, most of these structures have been abandoned and are beginning to deteriorate. Yet, due to the quality and quantity of the wood in these structures, many are being dismantled at a rapid pace by lumber companies to be sold as reclaimed lumber for high-end residences. As they stand derelict and in a partial state of decay awaiting pending demolition, we see a brief yet timely opportunity to record the architectural and industrial qualities of these unique utilitarian structures. The goals for this grant proposal are to: 1) Develop an inventory of timber grain elevators and silos in the Palouse region; 2) to select approximately five structures which best represent the broad range of structure types; and 3) to document the selected structures through photography and measured drawings.</p>					
28. Project start date:		06/01/2011		29. Project end date:	
		12/31/2011			
30. Is this a new proposal ?			<input checked="" type="checkbox"/>	Yes	No
31. Is this a resubmitted proposal ?			<input type="checkbox"/>	Yes	No
32. Are you a previous SIA Grant Awardee ?			<input type="checkbox"/>	Yes	No
33. Is this grant your only funding source ?			<input checked="" type="checkbox"/>	Yes	No
34. Total dollar amount requested: (send PDF of full budget)		\$ 3,000.00			
35. Total matching funds:		\$ 0.00			
36. Total project budget:		\$ 8,000.00			
37. Print Name of Principal Researcher:		Robert Hutchison & Taiji Miyasaka			
38. Signature (Please fax or scan/send PDF)					
39. Print Name of Sponsoring Org. Official					
40. Signature (Please fax or scan/send PDF)					

## **B. PROJECT SUMMARY**

Robert Hutchison and Taiji Miyasaka are seeking interim funding to support their ongoing project involving the documentation of abandoned and/or partially dismantled grain elevators & silos located throughout the Palouse region of southeastern Washington State. The Palouse is known for its fertile rolling hills, which were settled during a wheat-growing boom during the 1880's. Numerous timber grain elevators and silos were built up through the 1950's to provide storage for harvested grain. It is estimated that there are approximately 100 of these timber grain structures still remaining. Due to maintenance and fire concerns, most of these structures have been abandoned and are beginning to deteriorate. Yet, due to the quality and quantity of the wood in these structures, many are being dismantled at a rapid pace by lumber companies to be sold as reclaimed lumber for flooring in luxury residences. Until recently, these towers in the Palouse landscape have remained in limbo, stripped of their original function and difficult to adapt to new purposes, yet resistant to the detrimental effects of time and weathering. As they stand derelict and in a partial state of decay awaiting pending demolition, there appears a brief yet timely opportunity to record the architectural and industrial qualities of these unique utilitarian structures.

The principal researchers for this project are architects Robert Hutchison and Taiji Miyasaka. Hutchison is a part-time faculty member at the University of Washington Department of Architecture, and a Principal at Hutchison & Maul Architecture. He has extensive experience working on historic timber structures, has written numerous articles, and his work has been published widely. Miyasaka is an Associate Professor at the Washington State University School of Architecture & Construction Management. He has taught several architecture studios/seminars which have involved students in the research and documentation of agricultural structures in the Palouse region of southeastern Washington, and has written numerous articles.

For this grant proposal, the goal is to 1) develop an inventory of timber grain elevators and silos in the Palouse region; 2) to select approximately five structures which best represent the broad range of structure types; and 3) to document the selected structures through photography and measured drawings. Students from the Washington State University School of Architecture & Construction Management will be hired to assist in the documentation efforts. Future goals beyond this interim portion of the project include preparation of the material for exhibition at the Northwest Museum of Arts & Culture, and publication of the material in book format.

Hutchison and Miyasaka have been working on this project for over two years now. To date they have:

- Taught two design studios at Washington State University's School of Architecture & Construction Management which required students to document grain elevators and silos, and to propose design interventions to a specific structure and site;
- Written an article entitled "Timber Grain Elevator" which was published in the University of Washington Journal of Architecture Column 5 in 2009;
- Coordinated with students a documentary video that assembled interviews of farmers who discussed their connection to the history and use of timber grain elevators;
- Curated an exhibition of interim work (photographs, drawings, videos, and text) at the Artisan Barn Art Gallery in Uniontown, WA from April 11th to June 1<sup>st</sup> 2010;
- Assembled a postcard series entitled "Timber Grain Elevators & Silos of the Palouse" which is currently sold at bookstores in Seattle and Uniontown WA;
- Connected with numerous grain companies, farmers, and carpenters who have direct access to and knowledge of timber grain structures;
- Made connections with local and regional history organizations and museums;
- Discussed plans with the Northwest Museum of Arts & Culture to install an exhibit of work in 2012 or 2013;
- Had graduate students' work featured in Moscow-Pullman Daily News on November 8, 2010;
- Had graduate students' work featured in Spring 2011 Washington State Magazine.

## **C. APPLICATION NARRATIVE**

### **1. Documentation of need for the Project: What is the proposed project's significance to industrial heritage?**

Timber grain elevators and silos are a building typology unique to North America's agricultural regions. The first timber grain elevators are known to have been built using grain transfer methods developed by the inventor and millwright Oliver Evans. As settlers moved westward, the timber grain elevator became a building type that appeared in the landscape throughout the midwestern and western states. By the 1950's, construction methods had changed from wood to steel and concrete, materials which permitted larger structures to be built, and which were less susceptible to fire.

The Palouse region of southwestern Washington is known for its fertile rolling hills, which were settled during a wheat-growing boom during the 1880's. It is likely that some of the first structures built in the Palouse region were timber grain elevators. Due to maintenance and fire concerns, most of these structures have been abandoned and are beginning to slowly deteriorate. We estimate that there are approximately 100 to 150 of these timber grain structures still remaining. Yet, due to the quality and quantity of the wood in these structures, many are being dismantled at a rapid pace by lumber companies to be sold as reclaimed lumber for flooring in luxury residences. Recognizing that these unique structures are rapidly disappearing, we began to document them through photographs, drawings and models.

There are very few books written concerning the history of grain elevators and silos, and those that have been written tend to address the structures more from an aesthetic/landscape sensibility, rather than a historic or technological sensibility. There are no publications that we know of which address timber structures as a topic directly. One thing that we have found very interesting about all of the timber elevators and silos which we have been documenting is that while they might at first appear to be very similar, none of them are alike. Site and storage conditions dictated the size and height of the structures, as well as the size of the individual bins within the structures; and while the general timber construction method involved the stacking of 2x wood plates to achieve a wall system to support the high lateral loads imposed by the stored grain, there are numerous interesting local variations of timber construction methods. Also of interest are the elevator systems used to transport the grain from ground level up to the sorting house located at the top of the structure. The work that we propose to be implemented under this grant will be beneficial in preparation of material for future exhibition at the Northwest Museum of Arts & Culture, as well as publication of the material in book format.

### **2. What research methods will you employ?**

Numerous structures have already been identified and partially documented during previous reconnaissance visits to the Palouse. Due to the typically remote locations of these structures, they can be relatively easily identified in satellite photographs. Using Google Earth software, we will locate all elevators and silos within the Palouse region, geographically defined by the Snake and Clearwater Rivers to the south, the Washington/Idaho border to the east, and the Spokane River to the north. Brief reconnaissance site visits will be conducted to all of the structures to assess their general condition and status, and to obtain general information for inclusion in an inventory report.

Based on the completed inventory of structures, approximately five structures which best represent the broad range of structure types will be selected for more detailed measurement and drawing / photographic documentation. This documentation will record in detail the structures technical characteristics and architectural qualities. Photographs and drawings will be produced following general guidelines of the Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation. Our proposed timeline to conduct the work is as follows:

- June 2011: Assumed notice of grant award
- June – August 2011: Inventory Assessment Phase
- September – October 2011: Measurement and Documentation Phase
- November 2011: Assemble draft inventory report and draft drawings; select & process digital images;
- December 2011: Deliver final inventory report , drawings & photographs, and Abstract of Work to SIA

### **3. Who is responsible for your project?**

Robert Hutchison is a part-time faculty member at the University of Washington Department of Architecture, and a Principal at Seattle-based Hutchison & Maul Architecture. Before becoming an Architect, Hutchison practiced as a Staff Structural Engineer for Ortega Consulting, a small historic preservation firm located in Media PA. Hutchison worked as Project Manager and/or Staff Engineer on numerous historic timber structure projects, including the Pennsylvania Statewide Covered Bridge Assessment; the Old Economy Village Warehouse Stabilization project; and the Peace Church Roof Truss Stabilization project. In 2008 Hutchison taught a graduate design studio at Washington State University's School of Architecture & Construction Management with a focus on the documentation and reuse of timber grain elevators. Hutchison's architectural firm is currently providing pro-bono services for the non-profit Artisan Barn arts organization in Uniontown WA, involving the conversion of an existing timber grain silo adjoining an old dairy barn could into an art gallery. Hutchison's responsibilities will include:

- Assisting Miyasaka during the Inventory Assessment Phase;
- Leading the Measurement & Documentation Phase;
- Assisting Miyasaka in the preparation and assemblage of the final product.

Taiji Miyasaka is Associate Professor at the Washington State University School of Architecture & Construction Management. Prior to joining Washington State University, Miyasaka worked in architecture firms in New York City and Rotterdam (Netherlands). His primary academic focus is on the built environment in the Palouse region as topics for his teaching. His students work has been featured in Washington State Magazine and a local newspaper. Miyasaka's responsibilities will include:

- Leading the Inventory Assessment Phase;
- Assisting Hutchison during the Measurement & Documentation Phase;
- Selecting students and coordinating their assistance during the Measurement & Documentation Phase;
- Leading the preparation and assemblage of the final product.

### **4. What tangible products do you expect to produce with this project?**

Products which we expect to produce include:

- An Inventory Report outlining all known timber grain elevators and silos in the Palouse region. The report will include maps showing locations of the structures, and a photograph of each structure with an accompanying written description of the structure's estimated date of construction, its current condition and use status, approximate dimensions, specific timber construction type, and any unique architectural or industrial features. The report will be produced in electronic format using Adobe InDesign software, and then printed to a pdf file format for screen viewing and color hard copy output.
- Detailed documentation of five selected structures will then be performed using hi-resolution digital photography and measured drawings. Original photograph files will be Nikon Image Files (NEF), which will be digitally processed using Adobe Photoshop Lightroom, with post-processed files provided in .TIF file format. Drawings will be produced using AutoCAD software. Minimum drawings for each structure will include a site plan, floor plans, building elevations, and building sections.
- Final products will include an Inventory Report , Drawings & Photographs, and an Abstract of Work for SIA publication.
- For exhibition purposes, If possible additional tangible documentation methods will be explored, such as charcoal wall rubbings, and selected removal of building fragments from structures that are already in the process of being dismantled.

**D. BUDGET**

We require funding to support the following:

- Travel costs (roundtrip mileage from Seattle to Pullman incurred by Hutchison, and roundtrip mileage from Pullman to associated sites incurred by Miyasaka) in connection with assessment report and structure measurement/documentation;
- Salaries for students to assist in measurement and documentation of the selected ten structures;
- Drawing and photograph printing

The following is a breakdown of the anticipated budget:

Automobile Mileage, 500 miles (from Seattle to Pullman) x 2 x 2 round trips	31.5 cents	\$600
Automobile Mileage, 1000 miles (from Pullman to associated sites)	31.5 cents	\$300
Drawing and photograph printing	Allowance	\$500
Wages for students (Full time student: 4 at 40 hours each)	\$10.00/hour	\$1600
Wages for Hutchison & Miyasaka (2 at 100 hours each)	\$25.00/hour	\$5,000
<b>Total Project Budget:</b>		<b>\$8,000</b>
Fee Donation by Hutchison & Miyasaka		-\$5,000
<b>Requested Grant Amount</b>		<b>\$3,000</b>

▪ 2316 West First Avenue  
Spokane, Washington 99201-5906

▪ (509) 456-3931  
▪ fax (509) 363-5303  
▪ 24-Hr. Hotline. (509) 363-5315

▪ [www.northwestmuseum.org](http://www.northwestmuseum.org)



NORTHWEST  
MUSEUM  
OF ARTS  
& CULTURE

February 25, 2011

Society for Industrial Archeology  
Department of Social Sciences  
Michigan Tech  
1400 Townsend Drive  
Houghton, Michigan 49931-1295

Dear Grant Adjudicators,

The Eastern Washington State Historical Society dba Northwest Museum of Arts & Culture is pleased to support Taiji Miyasaka & Robert Hutchison's continuing investigations concerning Timber Grain Elevator and Silos of the Palouse.

The Society actively seeks partnerships to help ensure the preservation and access to information, ideas, and objects that articulate the Inland Northwest experience and we are currently discussing with Taiji and Robert the possibility for an exhibit of drawings, models and photographs to appear at the Northwest Museum of Arts & Culture in 2013 or 2014.

Sincerely,

Laura Thayer  
Museum Programs Manager  
509.363.5301  
[laura.thayer@northwestmuseum.org](mailto:laura.thayer@northwestmuseum.org)



## Whitman County Historical Society, Inc.

P. O. BOX 67, COLFAX, WASHINGTON 99111

Feb 28, 2011

### Letter of support for Robert Hutchison & Taiji Miyasaka:

The Whitman County Historical Society is pleased to support Robert Hutchison & Taiji Miyasaka's continuing investigations concerning Timber Grain Elevator and Silos of the Palouse. The history of the Palouse region revolves around its agriculture, and one of the visible signs of the rich harvests of the Palouse soil are the once numerous wooden elevators and silos. Because these are no longer economically viable, they are rapidly being lost. The documentation done by Hutchison and Miyasaka creates a record of these impressive structures. The WCHS is pleased to encourage your support of this valuable project. We are impressed with the work they have done and hope it can be continued.

Respectfully Submitted,

Edwin P. Garretson, Ph.D.  
Archivist, Whitman County Historical Society

THORNTON – ROSALIA – OAKESDALE – FARMINGTON – TEKOA – GARFIELD – ELBERTON – PALOUSE –  
HOOPER  
LACROSSE – HAY – DUSTY – COLTON – UNIONTOWN – JOHNSON – PULLMAN – ALBION – EWARTSVILLE –  
LAMONT  
ST. JOHN – PINE CITY – ENDICOTT – WINONA – COLFAX – STEPTOE – ALMOTA – MALDEN

February 27, 2011

Society for Industrial Archeology  
Department of Social Sciences  
Michigan Tech  
1400 Townsend Drive  
Houghton, MI 49931-1295

Support letter for Taiji Miyasaka and Robert Hutchison:

The School of Architecture and Construction Management at Washington State University is pleased to support Taiji Miyasaka and Robert Hutchison's ongoing investigation on timber grain elevators and silos of the Palouse region. Taiji has been a faculty member at Washington State University since 2002, and Robert taught a graduate studio as a visiting professor in fall 2008. They have been actively working on this theme since 2008. They have had successful graduate studios in which students worked on projects involving timber grain elevators and a silo. As a result, graduate student work on timber grain elevators was exhibited at the Artisan Barn in Uniontown, WA, in 2010. In addition, other student work on a timber silo was featured in the Moscow-Pullman Daily News and the Washington State Magazine. Their investigation on timber grain elevators and silos brings academic and educational benefits, as well as contributes to the local region.

The School of Architecture and Construction Management is pleased to recommend your support of this worthwhile investigation.

Sincerely,

Gregory A. Kessler AIA  
Professor and Director  
School of Architecture and Construction Management  
Washington State University  
509.335.5539  
gkessler@acm.wsu.edu



# ROBERT HUTCHISON

## CONTACT

4010 Whitman Ave. N., Seattle, WA 98103, 206.545.1991, rob@hutchmaul.com

## EDUCATION

**University of Washington**, Master of Architecture, 1996.

**Drexel University**, BS in Architectural Engineering, 1990.

**Drexel University**, BS in Civil Engineering, 1990.

## AWARDS & FELLOWSHIPS

### **2010 Japan-US Friendship Commission/NEA Creative Artists Exchange Fellowship Recipient**

Robert Hutchison is one of five national recipients of this 5-month Japan fellowship.

### **2009 Architectural League of NY Emerging Voice**

Hutchison & Maul is one of eight firms in North America that was selected as a 2009 Emerging Voice.

**Architecture Thesis Award Medal**, University of Washington, 1996.

**Valle Research Scholarship**, University of Washington, Oslo, Norway, 1996.

## PROFESSIONAL EXPERIENCE & AFFILIATIONS

**Registered Architect**, State of Washington, #8429.

**Principal**, Hutchison & Maul Architecture, May 2001-Present.

**Board Member**, 4Culture Public Art Advisory Committee, December 2008-Present.

**Board Member**, AIA Forum Magazine Editorial Board, 2009-2010.

**Board Member**, Space.City Board of Directors, February 2008 - Present.

**Project Manager & Project Architect**, The Miller/Hull Partnership, September 1994 - May 2001.

**Founding member**, *rectifier*, 1997.

**Project Assistant**, Jarmund/Vigsnæs Arkitekter, Oslo, Norway, September 1995 - December 1995.

**Project Engineer & Staff Structural Engineer**, Ortega Consulting, March 1989 - July 1992.

## ACADEMIC EXPERIENCE

**Program Director**, University of Washington Mexico Abroad Architecture Program, Winter 2010.

**Invited Juror**, University of Arkansas School of Architecture Reviews, Fall 2008, Spring 2009.

**Adjunct Professor**, WSU School of Architecture, Graduate Design Studio, Fall Semester 2008.

**Part-time Faculty Member**, Univ. of Washington Dept. of Arch., Design Studios 2001-Present.

**Invited Juror**, WSU School of Architecture Graduate Thesis Reviews, 2007-2009.

**Invited Juror**, University of Tennessee Thesis & Final Year Undergraduate Reviews, 2007.

**Host Firm** for WSU Final Reviews, Prof. Taiji Miyasaka, Hutchison & Maul, April 20, 2007.

**Invited Juror**, Univ. of Washington College of Architecture Thesis & Studio Reviews, 1996 - Present.

## ART INSTALLATIONS & EXHIBITIONS

**Storefronts Seattle Art Installation Program**, "Japan Streetscape | Seattle Storefront", Seattle WA, Summer 2011.

**"Timber Grain Elevators & Silos of the Palouse"**, Exhibition of Work, Artisan Barn Art Gallery, Uniontown WA, 2010.

**Exhibition of Work**, Hutchison & Maul, Univ. of Wash. Dept of Arch., March 2008 - July 2008.

**Featured Firm**, "New Edge New Blood: 12 Firms Shaping the Future of Seattle Architecture", AIA Seattle, 2008.

**"Hole House #2"**, Seattle WA, Deconstruction of existing garage, June 12-14, 2006, Project by Hutchison & Maul.

**"7"**, Astoria OR, Art Installation, September 2005, Project by Robert Hutchison & Sarah Biemiller.

**"Hole House #1"**, Seattle WA, Deconstruction of existing house, April 10-11, 2004, Project by Hutchison & Maul.

**Breadbox Exhibition**, Univ. of British Columbia, April 1999, Vancouver, B.C. (projects by *rectifier*).

## CURRICULUM VITAE

# ROBERT HUTCHISON

## LECTURES

- "**Courtyard House on a Steep Site**", University of Washington Dept. of Architecture, Seattle WA, Oct 21, 2010.  
"Creative Artist Forum", International House of Japan, Tokyo Japan, October 21, 2010.  
"On the Periphery of Architecture", Kobe Design University 2010 Lecture Series, Kobe Japan, Sept 28, 2010.  
"Recent Works", Tokyo University, Tokyo Japan, September 9th, 2010.  
"Architecture from the Center to the Periphery", Univ. Metropolitano Autonoma, Mexico City, Jan 2010.  
"The Negative can also be a Positive", 2009 Art, Literature & Architecture Symposium, WSU.  
"Prmatism and Envelope", 2009 Architectural League Lecture Series, March 2009.  
"Peripheral Architectural Investigations", WSU Dept. of Arch. Fall Lecture Series, Oct 2008.  
"Work", on work by Hutchison & Maul, WSU Dept. of Arch. Winter Lecture Series, Feb 2007.  
"rectifier", Reaction: Better City, Seattle, WA 1999.  
**Curator & Lecturer**, Space.City Lecture Series, "Architecture in Scandinavia", 1997.

## PUBLISHED ARTICLES, PAMPHLETS, EDITORIAL POSITIONS

### Postcard Series

"Timber Grain Elevators & Silos of the Palouse", assembled by Robert Hutchison & Taiji Miyasaka

### Article, written by Robert Hutchison & Taiji Miyasaka

"Timber Grain Elevators", Column 5, Univ. of Wash. Journal Architecture, 2009.

### Article, written by Prentis Hale & Robert Hutchison

"PARK HERE", Documentation of Parking Garages, Column 5, Univ. of Wash. Journal of Arch., 2007.

### Article, written by Prentis Hale & Robert Hutchison

"Interbay Roundhouse", Column 5, Univ. of Wash. Journal of Architecture, 2006.

### Article, written by Prentis Hale & Robert Hutchison

"Tsubota Industrial Supply Co.", Column 5, Univ. of Wash. Journal of Architecture, 2005.

### Article, written by Prentis Hale & Robert Hutchison

"Nike Missile Base S-20", Column 5, Univ. of Wash. Journal of Architecture, 2003.

### Article, written by Prentis Hale & Robert Hutchison

"Garage & Store Building", Column 5, Univ. of Wash. Journal of Architecture, 2002.

### Article, written by Prentis Hale & Robert Hutchison

"Menu", (Topic: Seattle Kingdome), Column 5, Univ. of Wash. Journal of Architecture, 2000.

### Article, written by Prentis Hale & Robert Hutchison

"Seattle Felt Co.", Column 5, Univ. of Wash. Journal of Architecture, 1999.

**Guest Editors, *rectifier***, Arcade Journal, Summer 1999, Volume 17.4.

### Article, written by Prentis Hale & Robert Hutchison

"Pacific Industrial Supply", Column 5, Univ. of Wash. Journal of Architecture, 1998.

### Pamphlet entitled "*rectifier*"

Documented under a grant from Allied Arts Foundation, 1998 (project by *rectifier*).

### Article, written by Prentis Hale & Robert Hutchison

"Rectifier Building", Column 5, Univ. of Wash. Journal of Architecture, 1997.

### Article, written by Prentis Hale & Robert Hutchison

"Flower Kiosk", Column 5, Univ. of Wash. Journal of Architecture, 1996.

### "Technology of Pennsylvania Roads, Bridges & Tunnels"

Historical Documentation Paper for the National Museum of Overland Transportation, 1991.

## ROBERT HUTCHISON

### ARCHITECTURAL WORK: HISTORIC / PRESERVATION

#### **Artisan Barn Artist Studio & Exhibition Gallery Addition**

Uniontown, WA, Currently in design, Project by Hutchison & Maul LLC.

#### **Artisan Barn Timber Grain Silo Conversion to Art Gallery**

Uniontown, WA, Currently in design, Project by Hutchison & Maul LLC.

#### **Inventory, Assessment, & Documentation of Timber Grain Elevators & Silos**

Palouse region of Washington State, Ongoing project in collaboration with Taiji Miyasaka.

#### **Peace Church Timber Roof Truss Stabilization**

Camp Hill PA, 1992, Documentation/assessment & stabilization of timber roof trusses inside historic Church.  
Project by Ortega Consulting, Staff Structural Engineer: Robert Hutchison.

#### **Statewide Timber Covered Bridge Assessment**

Pennsylvania, 1991, Assessment of 217 historic timber Covered Bridges throughout the state.  
Project by Ortega Consulting, Staff Structural Engineer & Project Manager: Robert Hutchison.

#### **Old Economy Village Timber Warehouse Stabilization**

Ambridge PA, 1991, Documentation/assessment & stabilization of historic timber warehouse.  
Project by Ortega Consulting, Staff Structural Engineer: Robert Hutchison.

### ARCHITECTURAL WORK: PUBLIC & COMMERCIAL

#### **City of Bothell Public Works Operations Center**

City of Bothell, WA, Construction 2010, Project by Hutchison & Maul LLC.

#### **Cayou Estuary Bridge Design**

Deer Harbor, Orcas Island, WA, Project 2005 (Unbuilt), by Hutchison & Maul LLC.

#### **Spirit Ridge Restroom Building**

City of Bellevue, WA, 350 SF, Project 2005 (Unbuilt), by Hutchison & Maul LLC.

#### **University Friends Meeting Worship Room Improvements**

4001 Ninth Avenue NE, Seattle, WA, 2,000 SF, Construction 2005, Project by Hutchison & Maul LLC.

#### **Dow Construction Office Building Improvements**

Seattle, WA, Facade Improvements, Construction 2004, Project by Hutchison & Maul LLC.

#### **Starbucks Drive-through Kiosk**

National Prototype, 600 SF, Construction 2004, Project by Hutchison & Maul LLC.

#### **Seattle Center Screen Wall**

Seattle Center, Seattle, WA, Shortlisted Proposal 2003 (Unbuilt), Project by Hutchison & Maul LLC.

#### **Dow Construction Office Building Addition,**

Seattle, WA, 18,000 SF, Project 2002 (Unbuilt), Project by Hutchison & Maul LLC.

#### **Pierce County Environmental Services Building**

Tacoma WA, 50,000 SF, Construction 2002, Project by Miller/Hull, Project Arch: Robert Hutchison.

#### **Pasta & Co. Retail Store Prototypes**

Issaquah & Redmond, WA, 2,200 SF, Construction 2001, Project by Hutchison & Maul LLC.

#### **Skagit Information Center**

Newhalem WA, 2,300 SF, Construction 2001, Project Miller/Hull, Project Mgr & Project Arch: Robert Hutchison.

#### **City of Bainbridge Island City Hall**

Winslow WA, 24,000 SF, Construction 2000, Project by Miller/Hull, PM & Project Architect: Robert Hutchison.

## ROBERT HUTCHISON

### PROJECT AWARDS

#### **2008 Honor Award for Washington Architecture**

Honor Award, Robert Hutchison & Sarah Biemiller, '7' - An Installation at Alderbrook Station.

#### **2003 National Top Ten Green Award, AIA & Committee on the Environment (COTE)**

The Miller/Hull Partnership, Environmental Services Building (Project Architect: Robert Hutchison).

#### **2002 PEEP Show Competition, Second Place Award**

Hutchison & Maul, Calgary ArtCity Pavilion International Competition Entry.

#### **2000 Seattle AIA Honor Award, 2001 Regional AIA Merit Award**

The Miller/Hull Partnership, Bainbridge Island City Hall (Project Mgr, Project Arch: Robert Hutchison).

#### **2000 National Top Ten Green Award, AIA & Committee on the Environment (COTE)**

The Miller/Hull Partnership, Bainbridge Island City Hall (Project Mgr, Project Arch: Robert Hutchison).

#### **1999 Seattle AIA Merit Award**

The Miller/Hull Partnership, Maury Island Cabin (Project Mgr, Project Arch: Robert Hutchison).

#### **1999-2000 Sunset Magazine Western Home Awards, Merit Award**

The Miller/Hull Partnership, Maury Island Cabin (Project Manager, Project Architect: Robert Hutchison).

#### **1998 Seattle AIA Citation Award**

Conceptual Category, "PARKing", (project by *rectifier*).

#### **1998 Wood Design Award**

The Miller/Hull Partnership, Maury Island Cabin (Project Mgr, Project Arch: Robert Hutchison).

#### **1997 Seattle AIA Citation Award**

Conceptual Category, "rectifier" (project by *rectifier*).

### PUBLISHED WORK

#### **The Architect's Newspaper**

"Hutchison & Maul Architecture, Emerging Voices 2009", by Alan G. Brake, 03/04/2009.

#### **ArchDaily, Featured Projects, 2009**

Work by Hutchison & Maul (Courtyard House, Wall + Roof Studio, Upside-down House, Lake House)

#### **Seattle Homes & Lifestyles**

Featured Work by Hutchison & Maul, Courtyard House, Article entitled "Light House", June 2009 issue.

#### **Seattle Magazine**

Featured Work by Hutchison & Maul, Wall + Roof Studio, Article entitled "Super Shed", May 2008.

#### **Northwest Home & Garden Magazine**

Featured Work by Hutchison & Maul, Wallingford Residence, Article entitled "Fun House", Jan 2007.

#### **Pacific Northwest Magazine Arts Issue**

Featured Work by Hutchison & Maul, Hole House #2, December 03, 2006.

#### **Arcade Journal**

Featured Firm: Hutchison & Maul, Article entitled "The Next Public Generation", Autumn Issue 2006.

#### **Arcade Journal**

Featured Work by Hutchison & Maul, Dow Construction Phase 2 Addition, Spring Issue 2002.

**Taiji Miyasaka**

310 Crestview, Pullman, WA 99163  
t. 509.332.1248, tmiyasaka@acm.wsu.edu

**EDUCATION**

Columbia University, New York, NY  
Master of Science in Advanced Architecture Design, 1992

University of Michigan, Ann Arbor, MI  
Master of Architecture, 1991

Kyoto University, Kyoto, Japan  
Bachelor of Engineering in Architecture, 1989

**ACADEMIC**

Associate Professor  
Washington State University, School of Architecture and Construction Management  
2008 - present

Assistant Professor  
Washington State University, School of Architecture and Construction Management  
2002 - 2008

**PROFESSIONAL**

Taiji Miyasaka Design, Pullman, WA, 2002 - present

Office for Metropolitan Architecture, Rotterdam, The Netherlands, 2000 - 2001

Pasanella + Klein Stolzman + Berg Architects, New York, NY, 1997 - 2000

Brian E. Boyle, AIA, New York, NY, 1995 - 1997

John F. Saladino, New York, NY, 1994 - 1995

Reiser + Umemoto, New York, NY, 1993 - 1994

Skidmore, Owings & Merrill, New York, NY, 1992 - 1993

**PEER REVIEWED PAPERS (International)**

"Design application of oriented strand composite," Fourth International Conference on Comparing Design in Nature with Science and Engineering, Algarve, Portugal, 2008. Abstract accepted, but not presented.

"Hard to Soft: The Response of 1960s Architecture to Mass Culture in England and Japan," Tectonics Making Meaning, Eindhoven, The Netherlands, 2007. Abstract accepted, but not presented.

"Arata Isozaki's Festival Plaza: Technological Transformation of the 1960s," The 6<sup>th</sup> International Symposium on Architectural Interchanges in Asia (ISAIA2006), Daegu, Korea. Refereed and presented in October 2006.

"Architectural Transformation in the Plastic Century," International Conference on Innovation in Architecture, Engineering and Construction, Rotterdam, The Netherlands. Refereed and presented in June 2005.

"Revealing Materials," Association of Art Historians (AAH) Annual Conference, Nottingham, England. Refereed and presented in April 2004.

"Machine Driven Materiality," CongressCATH 2004, Bradford, England (Theme: "The Architecture of Philosophy/The Philosophy of Architecture"), organized by the Arts and Humanities Research Board Centre for Cultural Analysis, Theory & History (CentreCATH). Refereed and presented in July 2004.

"Architecture as a Dynamic Process: A Rubber Project," Design Research Society International Conference, 2004, Melbourne, Australia. Abstract accepted, but not presented.

"Architecture as Dynamic Process," 5<sup>th</sup> European Academy of Design (EAD) Conference, Barcelona, Spain. Refereed and presented in April 2003.

#### **PEER REVIEWED PAPERS (National)**

"Plastic Culture in the Transportable Architecture of the 1960s," Society of Architectural Historians Annual Conference, Savannah, Georgia. Refereed and presented in April 2006.

#### **ARTICLES**

"Outside In - Architecture of the Pacific Northwest," (Interview/quoted), Washington State Magazine, Spring 2011.

"Timber Grain Elevators," co-author with Robert Hutchison, Column 5: Journal of the Department of Architecture, vol. 23, University of Washington, 2009.

"From Design Practice to Education," *Kenchiku Bunka*, Tokyo, April 2004.

"Prada Project by OMA," *Kenchiku Bunka*, Tokyo, August 2001.

"The Housing Problem and Diversity," an article reviewing the "un-private house" exhibit at MoMA, *Kenchiku Bunka*, Tokyo, December 1999.

"Interview with Julius Shulman," *Kenchiku Bunka*, Tokyo, September 1999.

"Deleuze, Bergson, Leibniz," *Kenchiku Bunka*, Tokyo, May 1998.

Design for a Humanities Institute, *Dimensions: Journal of the College of Architecture and Urban Planning*, vol. 5, University of Michigan, Spring 1991.

#### **BOOKS**

*The Wall*. 2010. co-author with Alessandra Como. Rome: Aracne Editrice, 2010.

*A Study of Louis Kahn*. Maeda, Tadanao. Trans. Taiji Miyasaka. Not yet published.

#### **COURSES TAUGHT**

Graduate seminar: Design Systems in Tectonics and Materials, 2007-present.

Graduate Design Studio, 2010.

Undergraduate seminar: Systems in Materials, 2007.

4th year undergraduate Design Studio, 2004.

3rd year undergraduate Design Studio, 2003-2009.

2nd year undergraduate Design Studio, 2002.

1st year undergraduate program coordinator, 2006-present.

1st year undergraduate Graphics Communication, 2002-present.

1st year undergraduate Visual Design, 2003-2010.

#### **LECTURES**

*"Materials Driven Systems"*

The University of Salerno, Salerno, Italy, October 2009.

*"Recent Fabrication by Students"*

Invited video conference lecture for Analysis + Representation I  
The University of Massachusetts, Amherst, MA, September 2009.

*"Emergence in Design"*

Invited video conference lecture for Analysis + Representation I at University of Massachusetts Amherst, March 2008.

*"Meet the Jurors: Presentation on Recent Work"*

AIA Southwest Washington, Tacoma, WA, November 2003.

*"Recent Work"*

Kobe Design University, Kobe, Japan, August 2001.

**WORKSHOPS**

"Materials Driven Systems," invitational two week workshop, The University of Salerno, Salerno, Italy, October 2009.

**EXHIBITIONS**

"Memoryscapes," CUB Gallery, Washington State University, Pullman, WA, October 2010.

"The Architect and the Urn," Lundgren Monuments Gallery, Seattle, WA, June-July 2010.

"Timber Grain Elevators and Silos of the Palouse," co-curated with Robert Hutchison, Artisan Barn, Uniontown, WA, April-May 2010.

"Wood Chair Series (Application of Oriented Strand Composite)," Juried Poster Session, 42nd Int'l. Wood Composites Symposium and Technical Workshop, Seattle WA, Spring 2008.

"Wood Chair Series (Application of Oriented Strand Composite)," Juried Poster Session, Washington State University Academic Showcase, Spring 2008.

"High Line Project, New York City," Juried Poster Session, Washington State University Academic Showcase, Spring 2006.

Exhibit of selected entries in the Sun Shelter Competition (with John Kelleher and Michael Young), Van Alen Institute, New York, NY, Fall 1997.

Design for Humanities Institute and Masking, Critics Choice Exhibition, Slusser Gallery, University of Michigan, Ann Arbor, MI, February 1991.

**INVITED JURIES**

Autonomous Metropolitan University - Xochimilco, Mexico DF, Mexico, final review of joint graduate studio between UAM-X and the University of Washington, March 2010.

Texas Tech University, College of Architecture, Lubbock, TX, second and third year studios, and Master of Architecture final review, April 2007.

The University of Hong Kong, Department of Architecture, Hong Kong, Master of Architecture review, April 2007.

University of Washington, Department of Architecture, Seattle, WA, Master of Architecture final review, June 2006.

American Institute of Architects (AIA) Wash. Council Civic Design Awards, Seattle WA, 2006.

American Institute of Architects (AIA) SW Wash. 2003 Honor Awards, Tacoma WA, Nov 2003.

Ohio State University Knowlton School of Architecture, Columbus OH, 2nd yr studio, June 2003.

Cornell University, Graduate School, Ithaca, NY, studio final review, Fall 1997.

Columbia University, GSAAP, New York, NY, Fall 1997, Spring 1994.

Yale University, School of Architecture, New Haven, CT, Fall 1993.

### **CONFERENCE CONVENED**

Co-chair, Architectural History and Theory Session, 6th International Symposium on Architectural Interchanges in Asia (ISAIA2006), Daegu, Korea, October 2006.

### **AWARDS**

Outstanding Teaching Faculty Award, School of Architecture, Washington State University, March 2005.

Asahi Kasei All-Japan Student Housing Competition. Honorable Mention, October 1988.

### **GRANTS**

William Zuk Fellowship to deliver a paper at the Society of Architectural Historians' 59<sup>th</sup> Annual Meeting in Savannah, April 2006 (\$250).

Asian American Pacific Islander Faculty and Staff Association Enhancement-Grants, Washington State University. Proposal funded for research on rubber materials and their possible use as architectural design components, February 2003 (\$400).

### **ACADEMIC SERVICE**

Chair, Curriculum Change Committee, 2010-2011.

Weller Teaching and Research Fellowship Search Committee, 2006-2007.

School Advisory Committee, 2004-2006, 2010-Present.

Lectures, Publications, Exhibitions, Web Development Committee, 2002-Present.

Design Faculty Search Committee, 2003-2004, 2005-2006.

### **PROJECTS**

Office for Metropolitan Architecture, Rotterdam, The Netherlands, 2000-2001

*Prada Project, New York City, NY:* In charge of interior coordination and display system team.

Pasanella + Klein Stolzman + Berg Architects, New York, NY, 1997-2000

*Cooper Union Redevelopment, New York, NY:* Project designer.

*New York AIA Corporate Headquarters Competition:* Project designer.

*Hadar Residence, New York, NY:* Project designer.

*The Shoreham Hotel II, New York, NY:* Project designer.

*Williamsburg Community Center, Brooklyn, NY:* Project designer.

*Stabile Hall Dormitory, Pratt University, Brooklyn, NY:* Construction team.

*Ganger Residence, Naples, FL:* Furniture Designer.

### **COMMUNITY SERVICE**

Presentation of Exhibit on "Timber Grain Elevators and Silos of the Palouse" to students of Colton Public School, Colton, WA, April 2010.

Mentor, Pullman High School Culmination Project, Live/Work Housing for an Artist in Pullman, WA, 2005-2006.

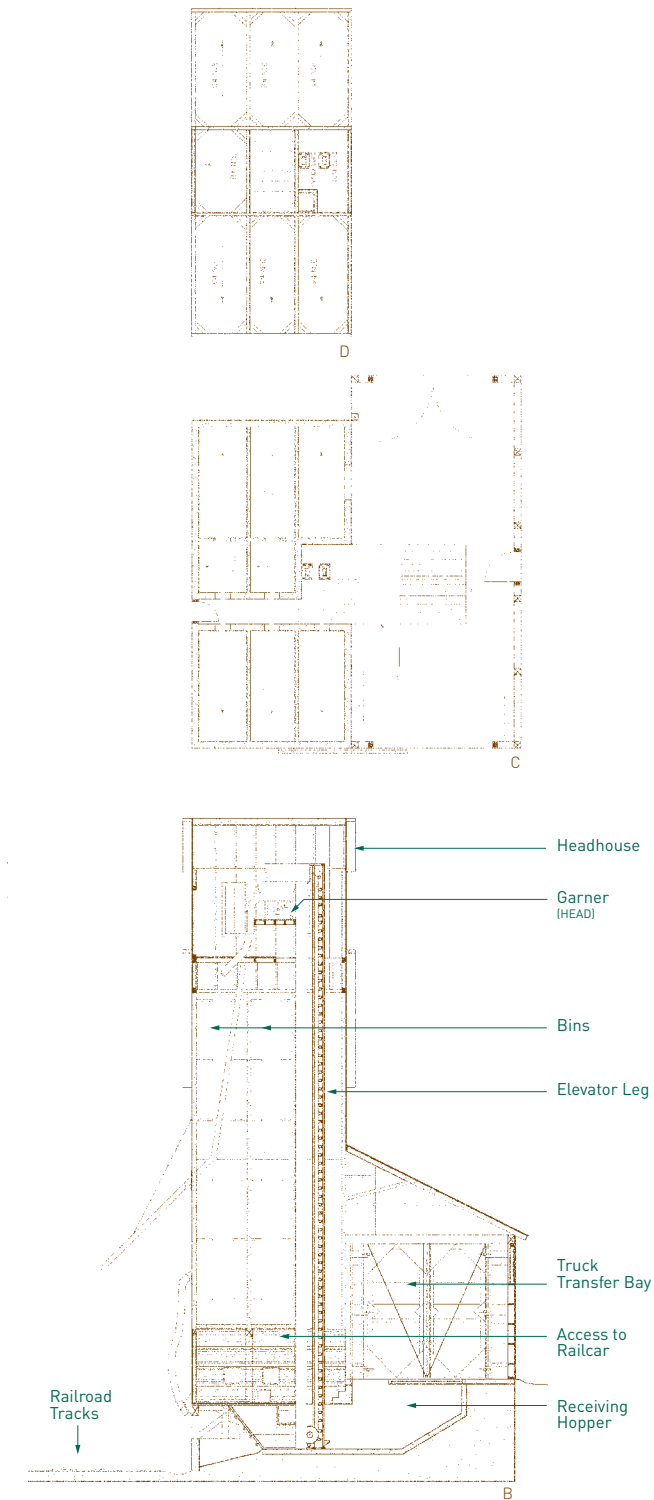


# TIMBER GRAIN ELEVATORS

## ROBERT HUTCHISON & TAIJI MIYASAKA



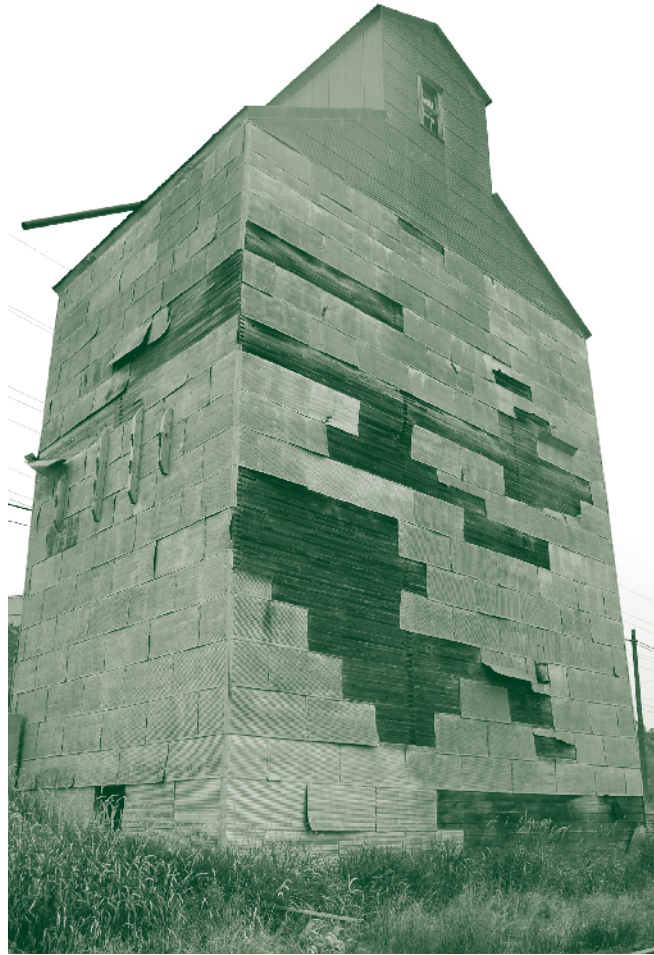
A



**A/** PHOTO MONTAGE OF WHELAN GRAIN ELEVATOR, PULLMAN WA, BY BRIAN O'CONNOR.  
**B + C + D/** SECTION, LOWER LEVEL PLAN, AND UPPER LEVEL PLAN. WHELAN GRAIN ELEVATOR DOCUMENTATION, PULLMAN WA, BY BRANDON HARRIS, BRIAN O'CONNOR, SCOTT NICHOLSON AND ROBERTO MEDINA.

**GRAIN ELEVATOR:** A building with appliances for receiving grain in large quantities from railway cars or other carriers, weighting, storing, and delivering to cars or vessels. It contains a receiving hopper into which the grain drops when discharged..., an elevator formed of buckets, or cups attached to an endless band, by which it is raised to the top of the building and discharged into a garner, from which it flows through spouts to a weighing machine. Thence it is transported to bins... The storage bins are deep and narrow pockets, constructed of timber and plank 12 or 14 feet square, and from 40 to 80 feet deep ... The exterior of the grain elevators are plain, but the arrangements for lighting, etc., often produce a picturesque outline, and they rise high above the houses of the city.<sup>1</sup>

Grain elevators are houses for grain, inhabited by humans only when grain is being transferred from or to the elevator. At the top of the grain elevator is the headhouse, also known as the sorting house, recognizable from the exterior by the gable roof and windows. Grain harvested from fields is delivered to the grain elevator by trucks, whence it is emptied into a receiving hopper below the grain elevator, and then transferred up to the headhouse using a grain elevator leg.<sup>2</sup> The headhouse is accessed using a single-occupant dumbwaiter which travels parallel with the grain elevator leg, and is either manually or electrically operated using a pulley and counterweight system. Within the headhouse, the grain that has traveled vertically along the elevator leg is transferred using a moveable spout into numerous bins. In order to prevent uneven settlement of the grain elevator building, grain must be evenly distributed to each of the bins.<sup>3</sup> When the time comes to transfer the grain, a spout at the bottom of the bin is opened to allow the grain to flow into a hopper, from whence it is transferred into waiting train cars or trucks by an auger conveyor.



E



F

**E/** KITZMILLER ROAD GRAIN ELEVATOR, PULLMAN WA.  
**F/** INTERIOR OF CRIBBED GRAIN ELEVATOR BIN LOOKING UP, ROUTE 195 GRAIN ELEVATOR SOUTH OF PULLMAN WA.  
**G/** DETAIL OF CRIBBED CONSTRUCTION, KITZMILLER ROAD GRAIN ELEVATOR, PULLMAN WA. PHOTOS E, F + G BY ROBERT HUTCHISON. **H/** TIMBER GRAIN ELEVATOR IN PROCESS OF BEING DISMANTLED, GARFIELD WA, PHOTO BY TAJI MIYASAKA.



G

The timber grain elevator emerged as a predominant American rural building typology during the 19th and 20th centuries. Their singular purpose is to provide prolonged storage capacity for harvested grain. The elevators are typically located along railroad spurs, to permit the storage of grain until transfer could be made from the elevator into railroad cars. They typically are constructed utilizing what is commonly termed “cribbed” construction, consisting of 2x4 or 2x6 lumber stacked throughout the height of the structure. This construction technique provides a retaining wall structure that is capable of sustaining the substantial lateral loads imposed by the stored grain. Most elevators are comprised of numerous ‘bins’ arranged in 3x3, 3x4 or 4x4 or more modules.<sup>4</sup> The bin dimensions are determined by the lateral structural capabilities of the 2x lumber.<sup>5</sup> Often, the lower half of the structure is constructed of 2x6 lumber, while the upper portion transitions to 2x4 lumber, alluding to the decreasing lateral loads imposed at the upper portions of the elevator. The bottoms of bins are either sloped or flat. Flat bins, while easier to construct, require manual labor to completely empty. Sloped bins are more difficult to construct, but can use gravity to empty completely.<sup>6</sup>

The form, proportions, and materiality of the timber grain elevator are directly informed by its singular purpose and fundamental construction technique. Bins are oriented vertically to utilize gravity for the transfer of grain. The dimensions of the individual bins are determined by the structural properties of the wood, and the manner in which the bins are organized determines the width and depth of the building. The vertical orientation of the bins, and the necessity that the headhouse be placed above the height of the bins, determines the height of the building. To prolong the life of the building against weather, the exterior timber walls are typically covered in metal siding. The cribbed construction is exposed when the metal siding is not maintained and subsequently peels away from the façade. The corners of the building are revealed as dovetailed joints; the section of the building is revealed in the façade where the intermediate bin walls intersect with the exterior wall.

In Fall of 2008, Robert Hutchison and Taiji Miyasaka taught a graduate design studio at Washington State University which argued for the reuse and integration of three timber grain elevators within the Pullman region, to serve as civic and research sites for the benefit of the city of Pullman and the



H

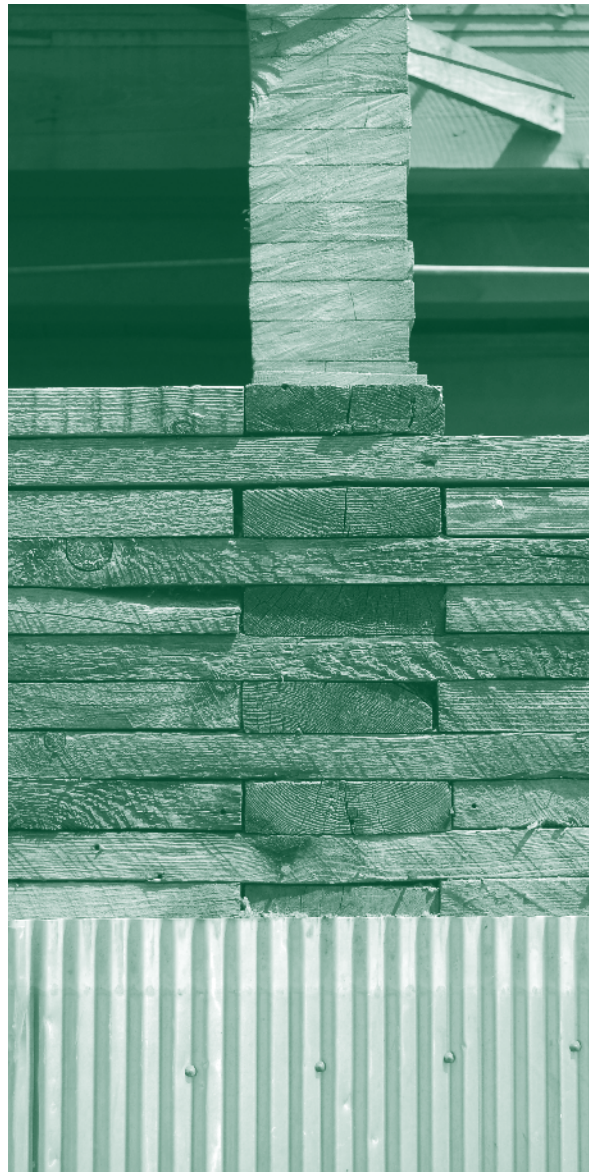
Washington State University.<sup>7</sup> As part of this studio, the grain elevators were documented using photographs and measured drawings, some of which are contained within this article.

Timber grain elevators first emerged on the Palouse landscape at the end of the 19th century as settlers began to develop the Pullman region, attracted by the fertile land for agricultural use. While originally served by the railroad, today’s farming practices increasingly rely on trucks to transfer grain from the harvest fields directly to shipping barges at the port of Lewiston on the Snake River.<sup>8</sup> This agricultural development, combined with the ability for concrete and steel elevators to hold larger quantities of grain, their being less susceptible to fire compared to their timber counterparts, and the high material and labor cost required to construct timber grain elevators, has meant that few new timber grain elevators have been constructed since the 1950’s.

Despite the pitfalls associated with timber grain elevators, some farmers find advantages in them. Mark Whitmore, a farmer who owns a timber grain elevator located in downtown Pullman, continues to use his timber grain elevator to store grain. “The wood walls of the elevator are advantageous compared to the steel and concrete counterparts, because

they actually absorb moisture from the grain. This allows me to use the building to dry the grain before it goes to market”. Also, multiple bins situated within one structure provide the ability to store multiple types of grains for varying lengths of time, allowing Whitmore the economic advantage to await favorable market fluctuations. Finally, the multiple bins allow him to “clean” the grain, a process where grain is moved from one bin to another through a sieve to remove impurities (such as particles of weeds from the harvest).

Yet farmers such as Mark Whitmore represent a minority. Insurance companies are resistant to provide insurance because of the higher fire hazard associated with timber grain elevators, and farmers note that more labor is required to clean the multiple bins. And while historically the labor required to carefully disassemble the structure has not outweighed the value of the material itself, this appears to be changing due to current economic conditions.<sup>9</sup> Due to a developing market for the salvage and reuse of quality timber, individuals and companies have emerged who specialize in dismantling crib elevators. Jeff Williams, owner of the Lazy J Lumber Co based in Genesee, Idaho, is currently dismantling several grain elevators in the Palouse. Williams stated that lumber from wooden cribs is often of very high quality, since the wood was harvested from virgin forests.



Williams “reclaims” the lumber to sell to mills, who reshape it into flooring, trim, wall coverings, and for any other purpose where good, high quality grained wood is desired. The time required to dismantle an elevator is typically one to two months, depending on its size.

Until recently, these sentinels of the Palouse landscape have remained in limbo, stripped of their original function and difficult to adapt to new purposes, yet resistant to the detrimental effects of time and weathering, and embodied with opportune material value. With their original function removed, as they stand derelict awaiting pending demolition, these buildings which were formerly filled with grain and darkness begin to acquire the architectural qualities of space and light. Yet ultimately, it is their material value which will result in the disappearance of the timber grain elevator from the rural landscape.

**I** DETAIL OF CRIBBED CONSTRUCTION, KITZMILLER ROAD GRAIN ELEVATOR, PULLMAN WA, PHOTO BY ROBERT HUTCHISON. **J** INTERIOR OF TRUCK TRANSE BAY, WHELAN GRAIN ELEVATOR, PHOTO MONTAGE BY BRIAN O’CONNOR.

The authors would like to thank Jeff Williams and Mark Whitmore for their assistance in the preparation of this article, and Prentis Hale for his editorial comments.

*Robert Hutchison is a Principal at Hutchison & Maul Architecture and Lecturer in Department of Architecture in the University of Washington. Taiji Miyasaka is an Associate Professor at School of Architecture & Construction Management in the Washington State University.*

#### Notes

1. *A Dictionary of Architecture and Building*, by Russell Sturgis, 1905, p. 288.

2. “The elevator leg consists essentially of two pulleys, one in the boot, and the other at the head, over which runs a belt, either a rubber or a chain belt; at intervals along the belt are metal buckets attached, which scoop up the grain from the boot and carry it to the head, where it is discharged into spouts, which [is] ... conveyed or spouted into bins.”

*The Design of Walls, Bins and Grain*, by Milo Smith Ketchum, 1907, p 225.

3. “Care must be used in filling elevators of this type for the first time, to fill all bins uniformly to prevent unequal settlement caused by the compression of the timber and the closing up of the horizontal joints. Cribbed timber bins have been known to settle 18 inches in a height of 70 feet.”

*The Design of Walls, Bins and Grain*, by Milo Smith Ketchum, 1907, p 225.

4. The grain elevator located in downtown Pullman, WA, owned by the farmer Mark Whitmore, has 15 bins, with a total building storage capacity of 50,000 bushels of grain. Whitmore often harvests a winter wheat called Madison wheat which is used for the production of beer. “Within the context of agriculture, bushel is defined as: A dry volume measure of varying weight for grain, fruit, etc., equal to four pecks or eight gallons (2150.42 cubic inches). A bushel of wheat, soybeans, and white potatoes each weighs 60 pounds.” ([www.hobbyfarmlife.com/dictionary\\_agriculture\\_terms/bushel.html](http://www.hobbyfarmlife.com/dictionary_agriculture_terms/bushel.html)). Thus, fully loaded Mark Whitmore’s grain elevator can store approximately (60 pounds x 50,000 bushels) = 3 million pounds, or 1,500 tons, the equivalent weight of approximately 1,000 automobiles.

5. “For large bins, the ‘crib’ construction is most used. In this construction, pieces of 2”x4”, 2”x6”, or 2”x8” are laid flatwise, so as to break joints and bind the structure together, and are spiked firmly. This makes a strong form of construction, and one very cheap with the former low price of lumber.”

*The Design of Walls, Bins and Grain*, by Milo Smith Ketchum, 1907, p 225.

6. Mark Whitmore noted that while sloped bins are easier to empty, the flat bins afford for more storage of grain.

7. The studio project intentionally focused on Washington State University, originally founded in the 1890’s as the state’s land-grant institution (the Washington Agricultural College and School of Science). Agriculture as a research topic continues to be of primary importance to the University. The studio program proposed that WSU was implementing a new environmental program to provide off-campus research stations that would serve as “meeting places” between research scientists and the general public. Initial funding would permit for the construction of an Orientation Center and two satellite Research Stations, while future planning would anticipate the creation of a network of at least ten additional satellite stations. The program noted that the University was requesting that sites with a history of agricultural use be given priority consideration. Accordingly, three grain elevator sites located in and around Pullman were selected to serve as the sites for these research stations. The program noted that the University required that the grain elevators be integrated with new construction to accommodate their programmatic requirements.

8. Mark Whitmore noted that railway service for the transportation of grain in and out of Pullman was terminated in 1994, due to the railway company continuing to raise prices. Farmers realized that transporting grain by trucks was cheaper even though trains can carry significantly more grain.

9. Demolishing these buildings is no easy task if the intention is to salvage the lumber for future sale or use. The cribbed construction technique utilizes long metal nails at regular intervals to spike multiple layers of lumber together. Mark Whitmore stated that 60 penny nails (2 gauge x 6” long) were used in the construction

