
International Conference on Factory Built Housing: Innovation in Home Manufacturing

US Department of Housing and Urban Development
Office of Policy Research and Development





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**Prepared for:
US Department of Housing and Urban Development
Office of Policy Research and Development**

**Submitted by:
Manufactured Housing Research Alliance
New York, NY**

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Disclaimer

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Final Report:

International Conference on Factory Built Housing: Innovation in Home Manufacturing

Objective

The idea of building homes in factories has taken hold in many parts of the world. Factory building is an emerging or growing part of the housing markets in many of the most industrialized nations and often for the same reasons, including: cost efficiency, increased quality and speed of site assembly. In these and other areas, factory building is one of the most promising approaches for meeting the global need for quality, affordable shelter.

While the factors that spur industrialization of housing may be the same across borders, the resulting form of the technology, the market entry point, home design and other aspects that characterize the local form of factory built housing are far from uniform. Worldwide, factory building is differentiated by a rich variety of building methods, materials and degree of automation. Factory building practices have evolved in areas such as Asia, the EU and North America with surprisingly little cross fertilization, despite in some cases, similarities in building practices (for example, the pervasive use of wood framing in both Scandinavia and the US/Canada).

The objective of the work which this report describes was to evaluate the opportunity and need for, and potential benefits of, an international conference on factory built housing. An additional objective was to begin to characterize the content and structure of such a conference. The method used was to conduct a planning summit, bringing together delegations representing a range of countries, to debate the merits and content of a potential conference or other means of achieving the goal of sharing information on factory building globally.

The Summit participants concluded that the best means of exchange for learning about international innovations in factory building would be a conference with a dual technical and business orientation.

Defining factory built

The central theme of the Conference—factory building—is a broad term alternatively referred to as prefabrication, off-site construction or industrialized building. The common aspect of all of these terms is the desire to accomplish much of the construction either away from the building site or at the building site using highly mechanized methods of construction to increase the speed of the building process and reduce housing costs.

Background

As a whole, the international industrialized building community possesses an immense knowledge base of building practices and methods but few opportunities exist to learn from advances pioneered by their counterparts in other countries and continents. As an initial step toward information sharing within the industrialized building community, MHRA developed the concept of an international conference on factory built housing. The conference would target public and private sector companies and organizations involved with factory building.

In order to evaluate the feasibility and benefits that might be associated with sponsoring an international conference on factory building, the following questions were asked:

- Is there sufficient interest on the part of international housing organizations and companies to justify such an event?

- What would be the costs and benefits to MHRA and its members of hosting an international conference?
- What other sources of funding (beyond industry) might be available to sponsor the event?
- How would the factory building industry in the US gain from information and technology sharing and networking with their counterparts in other countries?
- How would the conference be structured, who would be invited and what would be the venue and conference program?

To begin to answer these and related questions, a Planning Summit was held in Las Vegas on April 15 and 16, 2004 in conjunction with the Manufactured Housing Institute Congress and Expo. The purpose of the Summit was to gain consensus among leading housing institutions worldwide as to the value and content of an international conference. Nearly 200 invitations to participate in the Summit were sent to housing organizations world-wide. About 50 organizations responded and 40 of those expressed interest in the conference. Twelve of the 40 agreed to come to the Summit in Las Vegas—on what was relatively short notice—to help plan and organize the conference.

The Summit

The summit, *Innovation in Home Manufacturing—Common Ground*, provided a forum for sharing basic information about factory building practices, finding topics of mutual interest and setting the agenda for the future conference. Each delegation delivered a brief presentation describing their country’s factory building practices and suggesting topics for the conference. The summit also provided a springboard for growing the international component of the PATH program by seeding cooperative research with these agencies and organizations.

The program of presentations, plenary sessions and workshops envisioned for the International Conference is broad in scope reflecting a diverse audience drawn many from countries that have vastly different building practices. To develop a program responsive to the interests of such a diverse audience, it will be critical to have the guidance of leading housing organizations from around the world. These organizations represent countries or regions where factory built and prefabricated housing plays or has the potential to play an important role in meeting housing needs. Within the context of the Summit and future planning and dissemination of conference information, these groups form an Organizing Committee responsible for shaping the Conference program.



Summit host Roger Lyons, President of Penn Lyon Homes (US) kicks off the Summit meetings during the Thursday morning opening session

The Planning Summit was the first opportunity for the Organizing Committee to meet and discuss the Conference program. The goals for the Summit included the following:

- Develop the program and agenda for the International Conference on Factory Built Housing

- Identify groups/organizations from around the world that are potential Conference Organizers and Cosponsors
- Identify speakers and exhibitors
- Develop a preliminary plan for announcing the Conference worldwide

A list of Summit attendees is provided in Appendix A.

Summit Activities

The Planning Summit was designed as a series of working meetings to shape the agenda and format of the Conference. Active participation by everyone was encouraged to ensure the Conference topics address the issues that are most important to Conference attendees. The agenda for the Summit may be found in Appendix B. A description of each of the Summit activities follows:

- **Opening Session**

Summit Chairman Roger Lyons, President of Penn Lyon Homes introduced each participant and reviewed the goals of the Summit. Emanuel Levy, Executive Director of the Manufactured Housing Research Alliance discussed the agenda and format for the two days of Summit meetings.

- **Country Delegation Presentations**

Each country delegation delivered a brief (15-minute) presentation describing their nation's housing industry, the present and potential future role factory built and prefabricated housing, and top priority housing research. These presentations provided a common ground for discussion, a context for understanding the interests of each delegation in the factory built and prefabricated housing industry and began to suggest important Conference topics.

- **Breakout Sessions**

The range of possible program topics for the Conference was discussed in two parallel tracks—technical and business-related topics—divided into three sessions each. A list of session topics provided to participants is shown on Table 1.

This list was developed based on analysis of areas of international interest and a review of material provided by Summit attendees or summarized from information available from published sources, such as web sites. To help refine the draft list of topics before the Summit, participants were requested to complete a survey form posted on the Summit website. Items in bold are identified as more likely to have broad appeal and would generate the most participation and interest by Conference attendees. Other items on the list appear to be important to a smaller subset of organizations.

Table 1 List of Technical and Business Session Topics

TECHNICAL SERIES	BUSINESS SERIES
<p>Home Production</p> <ul style="list-style-type: none"> ▪ Automation / IT / increasing industrialization levels ▪ Lean production ▪ Mass customization ▪ Quality ▪ Training and labor ▪ Modular coordination and dimensional standardization ▪ Site installation 	<p>The Building Community</p> <ul style="list-style-type: none"> ▪ Regulatory issues and building standards ▪ Cooperation between industry, government and the research community ▪ Programs that encourage international cooperation in products and technologies ▪ Technology transfer and information dissemination
<p>Energy and Sustainability</p> <ul style="list-style-type: none"> ▪ Sustainable materials and technologies ▪ Employing methods for improving the energy efficiency of industrialized homes, including power-generating homes ▪ Public programs that encourage energy efficiency ▪ Healthy environments ▪ Reducing waste and energy use in the plant 	<p>Finance and Economics</p> <ul style="list-style-type: none"> ▪ International financing options ▪ Economic development (enterprise zones) ▪ The economic impacts of industrializing housing ▪ Private financing practices ▪ Public financing options
<p>Materials, Systems and Building Science</p> <ul style="list-style-type: none"> ▪ Building science issues (e.g. moisture problems, indoor air quality) (1-2) ▪ Building systems testing and approvals, including ISO 9000 ▪ Materials testing and approvals ▪ Performance (e.g. durability, disaster mitigation, life cycle cost) ▪ Innovative materials ▪ Systems integration ▪ Wet/service cores 	<p>Marketing</p> <ul style="list-style-type: none"> ▪ Case studies of international joint ventures ▪ Business models that work ▪ Design for industrialization (1-2) ▪ Urban applications ▪ Seniors housing/design for an aging society ▪ Public perceptions of industrialized housing ▪ Sales and marketing practices ▪ New markets for industrialized housing

To maximize representation in each of the meetings, non-US delegations that have two representatives at the Summit were requested to assign a representative to each track. Organizations with only one representative were assigned to one of the tracks based upon their interest areas. The breakout session assignment sheet is included in Appendix C.

Each breakout session ran 1 hour and 45 minutes. A moderator facilitated each of the sessions. The moderator’s role was to ensure that the viewpoints of each organization at the meeting were heard and that all contributions were incorporated into the group’s conclusions.

During the sessions, Summit participants were asked to suggest other Conference program topics and comment on the draft topics listed in Appendix B as well as recommend specific presentations and possible speakers.

Minutes from the breakout sessions are included in Appendix D.

Organizer’s Session

The results of each breakout session were summarized during the Organizer’s session at the end of the Summit. The Conference Organizing Committee consisting of each of the non-US delegations and a small contingent of US organizations (see Appendix E) made a preliminary selection of topics for the Conference, prioritizing the recommendations developed during the prior sessions. During this concluding session, organizers also discussed the proposed Conference format, plans to promote the Conference, a timeline of important Conference milestones and the role of the Conference co-sponsors.



Facilitator Michael Mullens of the University of Central Florida leads the discussion on the Energy and Sustainability topic area

Tours

Immediately preceding the Summit, two tours were conducted for Summit participants. On April 13, a tour of the Silvercrest Homes factory in Southern California was conducted, and on April 14, a tour of a manufactured home retailer and community in the Las Vegas area was conducted. Descriptions of both tours are included in Appendix F.

Conclusions

The Summit meeting established the value of holding an International Conference, as well as strong interest on the part of the international factory building community. Information about hotel costs and meeting logistics must be collected and analyzed to determine the financial prospects of the Conference. A draft program for the conference, based upon feedback from the Summit meetings, is presented in Appendix G.

Feedback from Summit Participants

In general, the Summit participants felt that the event was informative and worthwhile. The consensus opinion was that an international conference on factory-built housing is needed and would be highly successful. Thirty-five organizations volunteered to serve as co-sponsors for the prospective conference in their respective countries (see Appendix E). Co-sponsorship involved the following commitments:

- Serve on the Conference organizing committee providing input and feedback on the Conference plan and draft Conference programs;
- Represent the conference within their country, serving as a primary source of information for potential attendees;
- Distribute the conference promotional materials to organizations and individuals within their country, including industry, government, academia, and others;
- Identify and contact potential speakers from within industry, government and academia in their country;
- Identify and contact potential exhibitors from within the home building industry in their country;

- Co-brand conference materials for distribution within their country with their organization’s name and logo.

Many Summit participants expressed their satisfaction with the event. Some examples of their communications follow:

- John Longhurst, Halley Homes, Australia:
“Keen to come over and be involved”
- John Wood, National Lifestyle Villages, Australia:
“I appreciated being a part of your research into the international conference being proposed next year. I think you will make a major success of it.”
- Dael Perlov, Lifestyle Communities Pty. Ltd., Australia
“I have spoken to many of the Australians who sat in on the final 1- ½ days of your international sessions and they all said it was great and are looking forward to next year.”
- Lindsköld Stefan (Grou SE), European Network of Construction Companies for Research and Development (ENCORD), UK:
“Thank you for the information and most of all congratulations to a successful Summit. We have received very positive comments from David Martin of CORUS it is with a strong commitment that ENCORD is happy to accept your invitation and become the European co-sponsor of the international conference on industrialized housing.”
- Bill Healy, CIRIA, UK:
“We would be happy to co-sponsor the event and promote it within the UK industry and I look forward to receiving more details in due course.”
- Joe Odhiambo, Agrément South Africa, South Africa
“Agrément South Africa is willing to accept your request that we co-sponsor the International Conference.”
- Juan Monjo Carrió, Instituto de Ciencias de la Construcción Eduardo Torroja, Spain:
“I would like to confirm our acceptance for the co-sponsoring of the Conference and look forward the next steps to be followed.”
- Ing. Jirí Sobola, Technical and Test Institute for Construction (TZUS), Czech Republic:
“I thank you again for your hospitality and good organisation of preconference meeting and related excursions.”
- Tan Tian Chong, Building and Construction Authority, Singapore:
“Singapore Building and Construction Authority (BCA) is pleased to accept the invitation to be a co-sponsor of the International Conference on Industrialised Housing.”

Summit participants provided input regarding the proposed focus and structure of an international conference. Some of their recommendations follow:

- Juan Monjo Carrió, Instituto de Ciencias de la Construcción Eduardo Torroja, Spain:
“The conference should accept any kinds of materials and systems that will give a wider and richer content and will attract more assistants.”
- Kathleen Maynard, Canadian Manufactured Housing Institute, Canada:
“The idea of holding the Conference preceding the International Builders Show would likely attract the greatest participation from our group; many of our members attend the NAHB event, so could combine the two. It would be

important that the Factory-Built Conference activities preceded the International Builders Show as suggested, and were not scheduled concurrently, otherwise there would be scheduling conflicts. Our interest would also be greatest if the emphasis was placed on industrialized light frame, including modular units and panelization, as suggested.”



Delegates outside of one of Sun Valley’s model homes

- Enzo Gardin, National Research Council Canada, Institute for Research in Construction, Canada:
“If you can combine interesting presentations plus a trade show along with a warm climate, many Canadians would be interested in attending.”
- Ing. Jirí Sobola, Technical and Test Institute for Construction (TZUS), Czech Republic:
“We are willing to provide all necessary services as a contact point for the Czech Republic. In fact, I have presented outcomes from preparatory meeting to our association of building contractors experiencing lively response which would be stronger if a conference is not only limited to industrialized production of wooden houses. Mr Pohloudek who is Managing Director of a company exporting this kind of product has promised to take part in the conference and to contribute to my eventual presentation.”
- Dael Perlov, Lifestyle Communities Pty. Ltd., Australia
“From our perspective before the MHI congress is better, but I would suggest from a prefab building perspective, before the International builders show would be better. May I also suggest that you look at a section that concentrates on not just the builder's side, but also looks at how developers and land lease companies use the products and understand what they are looking for.”
- Vancler Candini, ASTIC - Association of Integrated Construction Industries, Brazil:
“It would be a great idea to hold the Conference in January 2006 preceding the International Builders Show run by the National Association of Home Builders. This being the largest homebuilding show in the world with over 100,000 attendees' presents and excellent opportunity for my company. The focus on industrialized light frame construction, including modular (volumetric) units and panelization works well with my company current direction and is most welcomed!”

- Gerardo Gonzales, UNIAPRAVI, Latin America:
“I am pleased to respond to your mail in behalf of Uniapravi. After sharing some ideas with Mr. Carlos Corado, we find the third alternative as the best choice, basically taking into account that the MHRA Conference would be hold within the framework of the NAHB International Builder's Show, being NAHB a Uniapravi member nowadays. In addition, the Orlando-Florida location appears to be more convenient to attract participants from Latin American countries.”
- John Longhurst, Halley Homes, Australia:
“If we were to have major sponsors with supply of materials etc at a conference it would be an advantage for any date”

After the Summit, MHRA initiated a dialogue with the NAHB to explore a partnership with the International Conference on Industrialized Housing and the International Builder’s Show.

- Lasse van Essen, NAHB, USA:
“Both NAHB's International Department and the Building Systems Councils will be glad to promote your Orlando Conference to their NAHB members via newsletter, web pages and onsite venues, including the 2005 International Builders Show. We also discussed collaboration to market the IBS and the 2006 MHRA conference in a coordinated manner, and possible coordination on housing and transportation.”

Conclusions

Based on the Summit experience, we can attempt to answer the following two key questions:

1. What is the real potential for international exchange, between the US and other countries?
2. What is the most effective means of fostering this exchange?

These issues are explored in the discussions that follow.

Potential for exchange

Based on the response to the idea for an international conference on industrialized housing and on the reaction to the Summit, there is a desire for an exchange of some sort among key industry players worldwide. Two primary types of exchange were explored at the Summit and in discussions with international representatives: an exchange of ideas and information – both technical and business related; and a commercial trade-based exchange. Both of these types were of interest to Summit participants.

The notes from the Summit technical sessions identify the topics of greatest interest for information exchange. There was substantial interest in looking at industrialized housing business models in other countries, exploring how different countries handle regulatory issues, examining case studies of successful and unsuccessful industrialized housing technology transfer, and expanding



Delegates had a chance to meet each other informally at the Wednesday evening reception

building science knowledge as it applies to industrialized housing.

While it was acknowledged that maintaining a strong focus would be important to an international conference, the wide variety of homebuilding methods used around the world meant that it would be important to include wood, steel, masonry and other types of building systems. In order to maintain focus on residential construction however, there was general agreement that a conference should be limited to low-rise construction.

There was little interest expressed in international trade in complete homes. Interest focused on the exchange of technology and business models, as well as possible exchange of select building components that are conducive to long-distance shipping. Most product-related discussion centered on the idea of technology licensing however, rather than import/export arrangements. This is due to the high cost of transporting large-scale home components and the desire to maintain local housing industries and its associated employment.

Means for exchange

MHRA explored three means of international exchange:

- **Conference.** Much of the discussion at the Summit focused on a potential international conference. A preliminary structure for a conference is described in Appendix G. Feedback from international contributors suggested that at least initially, the conference be co-located with another established building-related conference or convention such as the International Builder's Show. There was a desire to include an exposition of products and technologies in conjunction with a series of seminars and workshops.
- **Field Trips.** MHRA conducted two types of field trips in conjunction with or as a follow-up to the Summit (described in Appendix F): one to a manufacturing facility and the other to a retail center. These types of field trips would be a valuable addition to a conference, enabling attendees to tour production facilities and/or examples of housing in the region where the conference is held.

MHRA also organized two overseas trips for members of the American factory-built housing industry to tour facilities and housing in Sweden and Japan, respectively. These trips are intensive experiences where new ideas for building homes are fostered. They require a high level of time and commitment on the part of the traveler, and are expensive and difficult to coordinate. Other limitations of this type of trip are that they by nature must be restricted to a limited number of participants and developing long-term relationships between the visitors and the hosts is difficult.

- **Website.** MHRA developed a website for communicating with Summit participants. A website may be useful as a supplement to other activities such as field trips and conference but not as stand-alone method of information exchange. Meaningful exchange of industrialized building technologies depends on developing personal contacts and business relationships. It is difficult to make and maintain these solely through a website.

In summary, the means of exchange that in the long-term will be the most effective method for learning about international innovations in factory building while maximizing the number of people and organizations that can benefit is a regular (annual or bi-annual) conference with the following characteristics:

- Focuses on information exchange
- Contains a trade-show element for product and technology exhibition
- Is co-located with another popular building trade-related conference at least in the first one or two years.

- Is managed in terms of content and major decisions by a committee representing a cross section of international representatives
- Contains side trips to production facilities and housing development
- Is held in a desirable and easily reached location and at a desirable time of year to maximize participation

Appendix A—Summit Attendees

Table 2 Conference Program Contributors/Summit Attendees

Representative	Title	Organization web site	Nation
Mike McKittrick	Market Manager	Alcan Composites USA, Inc. www.alcan.com	United States
Carlos Martín	Del E. Webb School of Construction, Fulton College of Engineering	Arizona State University www.asu.edu	United States
Helcio Hernandes	Technical Director	Association of Integrated Construction Industries (ASTIC) www.astic.org.br	Brazil
Jaya Skandamoorthy		Building Research Establishment, Ltd. (BRE) www.bre.co.uk	United Kingdom
Kathleen Maynard	Executive Director	Canadian Manufactured Housing Institute (CMHI) www.cmhi.ca	Canada
V.K. Mathur	Director	Central Building Research Institute (CBRI) www.cbri.org	India
Ed Bryant	Vice President of Engineering	Champion Enterprises, Inc. www.championhomes.net	United States
Wang Dongsong	Director of Department of Business Plan	China Institute of Building Standard Design & Research (CIBSDR)	China
He Jianqing	Prof. / Deputy Director of the Department of R&D	China National Engineering Research Centre for Human Settlements (CNERCHS)	China
Harvey Bernstein	President	Civil Engineering Research Foundation (CERF) www.cerf.org	United States
David Martin	Manager of Construction Research	Corus UK Ltd www.corusgroup.com	United Kingdom
Angelo Grasso	President	European Liaison Committee for Social Housing (CECODHAS) www.cecodhas.org	Europe
Renata Pavlov	Counselor for International Affairs and Communications	European Liaison Committee for Social Housing (CECODHAS) www.cecodhas.org	Europe
Bill Farish	Director of Engineering	Fleetwood Enterprises, Inc. www.fleetwood.com	United States
Max Gomez	Executive Director, Global Business Development	Fleetwood Homes Corporation www.fleetwoodhomes.com	United States
Subrato Chandra	Project Director, Building America Industrialized Housing Partnership	Florida Solar Energy Center www.fsec.ucf.edu	United States
Huide Zhang	General Manager	Guanfang Metal Products Co., LTD Yunnan China	China
Tao Xie	Manager Assistant	Guanfang Metal Products Co., LTD Yunnan China	China
Gangsheng Gao	Vice Manager	Guanfang Woods Manufacturing Co., LTD Yunnan China	China
Juan Monjo-Carrió	Director	Instituto de Ciencias de la Construcción Eduardo Torroja www.ietcc.csic.es	Spain
Carlos Corado	President	Inter American Housing Union (UNIAPRAVI) www.uniapravi.org.pe	Latin America
Gerardo Gonzales		Inter American Housing Union (UNIAPRAVI) www.uniapravi.org.pe	Latin America
Peishi Zhu	General Manager	Kunming Xinyuan Sunshine Sci-Tech Co., LTD	China

Dael Perlov		Lifestyle Communities Pty. Ltd. www.mylifestyle.net.au	Australia
Chris Stinebert	President	Manufactured Housing Institute www.manufacturedhousing.org	United States
Jim Clifton	Vice President of Economics and Housing Finance	Manufactured Housing Institute www.manufacturedhousing.org	United States
Emanuel Levy	Executive Director	Manufactured Housing Research Alliance www.mhrahome.org	United States
Jordan Dentz	Senior Project Coordinator	Manufactured Housing Research Alliance www.mhrahome.org	United States
Enzo Gardin	Business Development Manager	National Research Council Canada (NRCC), Institute for Research in Construction (IRC) www.irc.nrc-cnrc.gc.ca	Canada
Bert Kessler	Director of Engineering	Palm Harbor Homes www.palmharbor.com	United States
Roger Lyons	Director	Penn Lyon Homes www.pennlyon.com	United States
Mike Slifka	President & CEO	PFS Corporation www.pfs-teco.com	United States
Larry Williams	President	Steel Framing Alliance www.steel framingalliance.com	United States
Jirí Sobola	Managing Director	Technical and Test Institute for Construction (TZUS) www.tzus.cz	Czech Republic
David Engel	Director, Office of Policy Development and Research	US Department of Housing and Urban Development	United States
Mike Mullens	Associate Professor and Principal Investigator, Housing Constructability Lab	University of Central Florida www.ucf.edu	United States
Ron Wakefield	Director of Environmental Design and Planning PhD Program	Virginia Polytechnic Institute and State University www.vt.edu	United States
Bruce Barron	Director	Westmont Pty Ltd	Australia

Appendix B—Planning Summit Agenda

PRE-CONFERENCE PLANNING SUMMIT AGENDA

Monday, April 12

Arrive in Los Angeles and Check-in hotel
Crowne Plaza Hotel Los Angeles Airport
5985 West Century Blvd.
Los Angeles, CA 90045
(310) 642-7500 Tel.

6:00 p.m. Dinner at Crowne Plaza Hotel

Tuesday, April 13

8:15 a.m. Meet in Lobby of Crowne Plaza Hotel

8:30 a.m. Depart for Manufactured Housing Plant Tour in Southern California

10:00 a.m. – 10:30 a.m. Orientation at Manufactured Housing Plant

10:30 a.m. – 11:30 a.m. Tour Manufactured Housing Plant

11:30 a.m. – 12:30 p.m. Tour Model Homes; Q&A; Closing Remarks; Lunch

12:30 p.m. – 1:00 p.m. Enroute to Ontario Airport

2:00 p.m. Depart Ontario Airport

2:53 p.m. Arrive Las Vegas Airport

3:00 p.m. Shuttle bus from airport to Caesar's Palace

Check-in
Caesar's Palace
3570 Las Vegas Blvd, South
Las Vegas, NV 89109
(702) 731-7110

3:00 p.m. – 8:00 p.m. Registration Open

6:45 p.m. – 8:30 p.m. Reception in Exhibit Area (The Palace Ballroom, 4th Floor)

Wednesday, April 14

8:00 a.m. – 5:00 p.m. Registration Open

9:45 a.m. Community Tour: Meet at Caesar's Palace Hotel Check-in Area

10:00 a.m. – 10:20 a.m. Depart from Caesar's Palace
Enroute to Sun Valley Homes Sales Center

10:20 a.m. – 11:05 a.m. Arrive Sales Center and Begin Tour

11:05 a.m. – 11:30 a.m. Depart for Mountain View Community

11:30 a.m. – 12:30 p.m. Tour of Mountain View Housing Community

12:30 p.m. – 1:00 p.m. Return to Caesar’s Palace

Lunch on own

5:30 p.m. – 7:00 p.m. Welcome Reception (Otho room, 4th Floor)
Roger Lyons, Conference Chair

Thursday, April 15

8:30 a.m. – 9:30 a.m. Welcome, Introductions (Otho room, 4th Floor)
Roger Lyons, President, Penn Lyon Homes, Conference Chair
David Engel, Director, Office of Policy Development and Research, US
Department of Housing and Urban Development

9:30 a.m. – 9:45 a.m. Break

9:45 a.m. – 12:00 p.m. Presentations by Country Delegations
(Otho room, 4th Floor)

9:45 a.m. – 10:15 a.m. UK and Europe, **David Martin**, Corus UK, Ltd.

10:15 a.m. – 10:30 a.m. UK, **Sue Rogers**, Building Research Establishment, Ltd.

10:30 a.m. – 10:45 a.m. Spain, **Juan Monlo-Carrío**, Instituto de Ciencias de la Construcción
Eduardo Torroja

10:45 a.m. – 11:00 a.m. Europe, **Angelo Grasso**, European Liaison Committee for Social Housing

11:00 a.m. – 11:15 a.m. Czech Republic, **Jiri Sobola**, Technical and Test Institute for Construction

11:15 a.m. – 11:30 a.m. China, **He Jianqing**, China National Engineering Research Center for
Human Settlements

11:30 a.m. – 11:45 a.m. Canada, **Kathleen Maynard**, Canadian Manufactured Housing Institute and
Enzo Gardin, National Research Council Canada

11:45 a.m. – 12:00 p.m. Australia, **Dael Perlov**, Lifestyle Communities Pty. Ltd.

12:00 p.m. – 1:15 p.m. Lunch in Exhibit Area (The Palace Ballroom, 4th Floor)

1:45 p.m. – 3:00 p.m. Completion of Presentations by Country Delegations
(Otho room, 4th Floor)

1:45 p.m. – 2:00 p.m. Latin America, **Carlos Corado**, Inter American Housing Union

2:00 p.m. – 2:15 p.m. Brazil, **Vancler Candini**, Association of Integrated Construction Industries

2:15 p.m. – 2:30 p.m. India, **V.K. Mathur**, Central Building Research Institute

2:30 p.m. – 2:45 p.m. United States, **Max Gomez**, Fleetwood Enterprises

2:45 p.m. – 3:00 p.m. Break

3:00 p.m. – 3:30 p.m. Review of Technical/Business Session Format and Procedures
(Otho room, 4th Floor) Emanuel Levy, MHRA

Technical Topics

Business Topics

3:45 p.m. – 5:30 p.m. Home Production
(Genoa room, 3rd Floor)
Facilitator: **Ron Wakefield**, VPISU

The Building Community
(Milan room, 3rd Floor)
Facilitator: **Dr. Carlos Martín**, ASU

5:30 p.m. – 6:30 p.m. Facilitators’ Meeting (Milan room, 3rd Floor)

Dinner on own

Friday, April 16

	Technical Topics	Business Topics
8:30 a.m. – 10:15 a.m.	Energy and Sustainability (Genoa room, 3rd Floor) Facilitator: Dr. Mike Mullens , UCF	Finance and Economics (Milan room, 3rd Floor) Facilitator: Ron Wakefield , VPISU
10:30 a.m. – 12:15 p.m.	Materials, Systems and Building Science (Genoa room, 3rd Floor) Facilitator: Dr. Mike Mullens , UCF	Marketing (Milan room, 3rd Floor) Facilitator: Dr. Carlos Martín , ASU
12:15 p.m. – 1:45 p.m.	Facilitators' Meeting (Milan room, 3rd Floor)	
12:30 p.m. – 1:30 p.m.	Lunch (Otho room, 4th Floor)	
1:45 p.m. – 3:00 p.m.	Technical Business Sessions Wrap Up (Otho room, 4th Floor)	
3:00 p.m. – 3:15 p.m.	Break	
3:15 p.m. – 4:30 p.m.	Organizer's Session: Next Steps (Otho room, 4th Floor) Roger Lyons, Conference Chair Emanuel Levy, MHRA	

Meeting room locations at Caesar's Palace Hotel are shown in parentheses.

Appendix C—Breakout session assignments

			Technical Sessions (Genoa Room)			Business Sessions (Milan Room)		
Representative	Organization	Nation	Production	Energy	Materials	Community	Finance	Marketing
Mike McKittrick	Alcan Composites USA, Inc.	US		■	■			
Carlos Martín	Arizona State University	US					■	
Vancler Candini	Association of Integrated Construction Industries (ASTIC)	Brazil			■	■	■	
Jaya Skandamoorthy	Building Research Establishment, Ltd. (BRE)	UK	■	■	■			
Sue Rogers	Building Research Establishment, Ltd. (BRE)	UK				■	■	■
Kathleen Maynard	Canadian Manufactured Housing Institute (CMHI)	Canada		■		■		■
V.K. Mathur	Central Building Research Institute (CBRI)	India	■		■		■	
Ed Bryant	Champion Enterprises, Inc.	US	■					
Andy Scholz	Champion Enterprises, Inc.	US						■
Wang Dongsong	China Institute of Building Standard Design & Research (CIBSDR)	China				■	■	■
He Jianqing	China National Engineering Research Centre for Human Settlements (CNERCHS)	China	■	■	■			
Harvey Bernstein	Civil Engineering Research Foundation (CERF)	US				■		
David Martin	Corus UK Ltd	UK	■	■				■
Angelo Grasso	European Liaison Committee for Social Housing (CECODHAS)	Europe				■	■	■
Renata Pavlov	European Liaison Committee for Social Housing (CECODHAS)	Europe				■		■
Bill Farish	Fleetwood Enterprises, Inc.	US				■		
Max Gomez	Fleetwood Enterprises, Inc.	US					■	■
Subrato Chandra	Florida Solar Energy Center	US		■				
Huide Zhang	Guanfang Metal Products Co., LTD	China	■	■	■			
Tao Xie	Guanfang Metal Products Co., LTD	China				■	■	■
Gangsheng Gao	Guanfang Woods Manufacturing Co., LTD	China	■		■		■	
Juan Monjo-Carrió	Instituto de Ciencias de la Construcción Eduardo Torroja	Spain	■		■			
Carlos Corado	Inter American Housing Union (UNIAPRAVI)	Latin America				■		■
Gerardo Gonzales	Inter American Housing Union (UNIAPRAVI)	Latin America	■	■	■			
Peishi Zhu	Kunming Xinyuan Sunshine Sci-Tech Co., LTD	China		■		■		■
Dael Perlov	Lifestyle Communities Pty. Ltd.	Australia	■				■	■
Jim Clifton	Manufactured Housing Institute	US					■	
Yechiel Rosenfeld	National Building Research Institute	Israel	■	■	■			
Enzo Gardin	National Research Council Canada (NRCC), Institute for Research in Construction (IRC)	Canada		■	■	■		
Bert Kessler	Palm Harbor Homes	US	■	■				
Roger Lyons	Penn Lyon Homes	US						■
Mike Slifka	PFS Corporation	US			■	■		
Larry Williams	Steel Framing Alliance	US			■			
Jirí Sobola	Technical and Test Institute for Construction (TZUS)	Czech Republic	■	■	■			
David Engel	US Department of Housing and Urban Development	US				■		
Mike Mullens	University of Central Florida	US	■					

Assignments were made based upon interest and to evenly distribute geographical representation in each topic area. Participants may modify their session assignments by speaking with an MHRA representative.

Appendix D—Breakout session minutes

The following meeting minutes were taken during the pre-conference planning summit for the international conference on factory built housing. Six sessions were conducted (three on business topics and three on technical topics) with the aid of a facilitator during which potential topics for the upcoming conference were discussed and debated. The minutes represent the list of topic areas, in some cases ranked by priority or grouped into categories, that the delegates at the meetings settled on as the most important subjects to include in the program for the conference.

Business Topic: The Building Community

Thursday, April 15, 2004

4:30 p.m. – 5:35 p.m.

Milan Room

Ten specific issues were addressed to arrive at three to five topics for the proposed International Conference on Industrialized Housing, The Building Community area.

Following were the ten topics discussed at the session.

I. Regulatory successes and failures

- Codes, zoning, land use, and government influence can be considered
- Should there be any institutional barriers (legal issues and insurance issues)?
- How far should the topic advance since regulations (codes or standards) may actually become the barrier?
- Some countries lack regulations governing factory-built housing
- Countries have different approaches to what is regulatory or institutional aspects
- Successes (benchmarks) that have to be used abroad
- Possible focus on failures (possible aspect of a presentation) to learn from mistakes
- Separation of HUD Code vs. modular; some countries have both types of codes; development of a common code for all factory-built housing could be a goal for international commerce

II. Industry and world wide collaboration

- Cooperative ventures between government and industry, and how they translate to international opportunities

- Collaboration of countries for harmonization
 - Techniques to learn from each country
 - Learn from each other rather than re-inventing the wheel
 - Best practice approach (develop protocol and criteria for administering)
 - Product development with certification criteria for materials, components and systems (window components, for example)

III. Technology transfer and information dissemination

- Checks and balances between countries
- Case studies of transfer between countries
- Successful business models
- Educational/cultural aspects of factory-built housing
- Value of technology transfer
- Potential for technology transfer between countries
- Educational activities to accomplish technology transfer and dissemination

IV. Industrial roles and relationships

- Labor has its own category
- Many facets to consider between US, Europe, Australia and developing countries

- V. Industrial roles and relationships**
 - Consider architectural aspects
 - Construction of informational systems by industrial housing sector
 - Manufacturer/builder relationships
 - Why do builders invest in factory-built housing?
 - Investors in factory-built housing producers (investment capital)

- VI. Sociopolitical climate for industry**
 - Market drivers
 - Investor models
 - Performance models

- VII. Sociopolitical climate for industry**
 - Institutional aspects
 - Law (contracts and liability)
 - Insurance (homeowners, supplier of materials and warranty responsibilities)
 - Real estate (appraisals, land purchase and revitalization of urban areas)

- VIII. Delivery**
 - Transportation of factory-built homes (in-country and between countries)
 - Mechanisms to perform transportation activities

- IX. Retrofit and rehabilitation**
 - Using factory-built housing for revitalization of existing housing
 - Pre-set kits
 - Prefabricated components
 - Methods to retrofit/rehabilitate/rebuild
 - Opens up whole new market
 - Urban areas in Europe a major issue

- X. Research community and collaboration**
 - Implementation of research by industry in a timely manner
 - Infrastructure
 - Monitoring

Those in attendance were asked to vote for their four top choices to be considered for the Business Session: The Building Community. The results of the votes were:

I – 11	III – 12	V – 1	VII – 1	IX – 12
II – 5	IV – 2	VI – 2	VIII – 0	X – 10

The following would be presented to the facilitating committee for possible topics of discussion for 2005 International Conference covering this potential building session topic:

- III Technology transfer and information dissemination
- IX Retrofit and rehabilitation
- I Regulatory successes and failures
- X Research community and collaboration
- II Industry and worldwide collaboration

Business Topic: Finance and Economics

Friday, April 16, 2004

8:30 a.m. – 10:15 p.m.

Milan Room

I. International financing programs and incentives

- Public/NGO program status
- Private program status
- ABS markets (lessons learned in US economy)
- Getting international funds (sample pro formas)
- Housing in International Economics (e.g., international investment markets in US housing)
- Housing's role in national economics
 - Government's role in subsidizing housing (in relation to manufactured housing)
 - Factors for programs: growth and demand (human need) and employment

II. Financing

- Developers' financing – benefits of using factory built housing
- Consumers mortgage and closing mechanisms: innovations and traditional
- Developing secondary mortgage markets
- History and application of real property verses chattel loans verses personal property in comparison
 - Alternative approaches

III. Manufacturers' economic models

- Factory investment models
- Types, case studies of capital (equipment, plant, material access, distribution channel, etc.) [Possibly break up into these individual investment factors]

IV. What are the markets?

- Public and quasi-public markets
- Private Sector financing (Same as I?)
- What are the drivers for private developers?
- Housing market structure
 - Is there a history of market developments?
 - Growth and demand (Human need)
 - Factors for determining whether a market is "primed"?

Final topic area name: "The business case for international industrialized housing"

1. How do you determine a market?

Market Determination Models: Domestic, International, Government Role

2. How do you make the market work?

Financing Investment Models: Manufacturers, Developers, and Consumers

3. What is the history and the current status of financing sources?

Current Financing Opportunities and Programs: Public, Private, Incentives, and Successes

Program chair: Max Gomez

Panel: Jim Clifton, Carlos Martin, Caroline Bergfeld, Bruce Carter, VK Mathur will identify an Indian representative, Carlos Corado will identify a UNIAPRAVI member, Vancler Candini will identify a Brazilian representative, Mexican representative.

Business Topic: Marketing

Friday, April 16, 2004

10:30 a.m. – 12:15 p.m.

Milan Room

I. Case studies of international joint ventures

- Canada-US
- Lindel Cedar in Japan
- Forest Homes
- Field trips
- Borrowing ideas

II. Business models that work

- Professional sales development (Canada)
- Integrating product marketing
- Luxury factory-built housing
- Vertical integration (including lending, sales)
- Sales centers that change the image of factory-built housing
- Governments verses market segments

III. Design for industrialization

- Considers architectural design and production
- Financial institutions
- Not on par with site built
- Flexibility, quality
- Durability/longevity

IV. Urban applications

- Rehab/reconstruction
- Granny flats / garden suites

V. Seniors housing / design for an aging society

This is an item under the New Markets sub-topic

VI. Public perceptions of industrialized housing

→ Rename this sub-topic: Changing perceptions of industrialized housing

- Zoning
- Security
- Purchasing process

- Terminology

VII. Sales and marketing practices

- The 4 P's
- Multifamily developer verses homeowner customer
- Distribution

VIII. New markets for industrialized housing

- Tourist / recreation accommodations
- Export kits
- Emergency shelter
- Migrant housing
- Remote housing (mines)
- Temporary dwellings
- Aboriginal housing
- High end / middle class homes
- Multifamily housing
- Co-housing/Corporate housing developments
- Client-customized homes
- Baby boomers / Gen X market

Themes of the Marketing topic: Awareness, perception and acceptance

Can be grouped into the following three categories:

- Awareness: market/marketing types
- Perception: barriers (opportunities) and determinants
- Acceptance: practices and successes

Suggested speakers

- Lindal Cedar
- Marketing staff of industrialized housing companies
- Staff from suppliers of timber, gypsum, steel.

Technical Topic: Home Production

Thursday, April 15, 2004

4:30 p.m. – 5:35 p.m.

Genoa Room

I. IT/Automation/ industrialization levels

- Information technology should be separate subject because it is involved in all aspects of the production process.
- This sub-topic should include new methods of automation, both hardware and software

II. Lean production

- Lean production must be clearly defined – suggest “optimized production”
- Includes benchmarking and scheduling

III. Mass customization

- Mass customization is a marketing decision – the production items are included in “lean production” and “modular standardization”.
- Modular standardization is a way to do mass customization. Modular standardization opens up other possibilities for international cooperation, home or retrofit kits, etc.

IV. Quality management

- Insurance companies may have input into the question of what items are most important in this subject.
- Includes ISO 9000 series and other quality programs.
- Quality management focuses on management tools

Technical Topic: Energy & Sustainability

Friday, April 16, 2004

8:30 a.m. – 10:15 a.m.

Genoa Room

I. Sustainable materials and technologies [#1:6 / #2:3 / #3:2]

- Renewable energy such as solar [Y]
- Recyclable/movable homes (deconstruction) [N]
- Recycled materials [Y]
- Green building and bioclimatic architecture (includes water conservation) [YY]
- Communication link between the developer and manufacturer to ensure sustainability [N]
- Sustainable community design [Y]
- Retrofit package for sustainability and energy efficiency [YY]
- Land reclamation / brownfield development with manufactured housing [N]

II. Employing methods for improving the energy efficiency of industrialized homes and communities, including power-generating homes [#1:5 / #2:5 / #3:1]

- Integrated techniques – integrate into building components and manufacturing line (the cost of some energy generating technologies is substantially increased by installation) [YY]
- Design for efficiency – same as above
- Maintenance of energy features – only if special to factory-built homes [MIXED]
- Lifecycle costing [N]
- Automatic integration of energy sources [N]
- Technologies [Y]
- Special equipment for factory-built homes – included in above
- Benchmarking – [MIXED]
- Embodied energy, including transport [N]

- III. Public programs (not just public) and policies that encourage or require energy efficiency and/or sustainability [#1:2 / #2:3 / #3:3]**
- ISO 14000 – includes sustainability [Y]
 - Government programs, incentives, tax credits for sustainability and/or energy efficiency [Y]
 - Industry initiatives – ISO 14000 series [Y]
 - Building codes and standards as they address energy usage [Y]
 - Utility or government sponsored programs to provide maintenance for energy features of homes [MIXED]
 - Incentives vs. regulations – case studies / lessons learned
- IV. Healthy environments [#1:0 / #2:2 / #3:2]**
- Healthy products and rating systems
 - Design for high occupancy
 - Monitoring and control systems
 - Healthy environments belongs in building science topic area.
- V. Reducing scrap (waste) and energy use in the plant [#1:0 / #2:0 / #3:4]**
- products for healthy production environments
 - recycling, waste reduction
 - design for water minimization

Reducing scrap (waste) belongs in home production topic area.

- VI. Innovative technologies and policies**
- This category would be distributed over all other categories

New sub-topic: Human and social dimensions

- Migrant worker housing
- Social sustainability
- Also emergency, age restricted, temporary, remote (mines), and tourist housing

This topic belongs in Marketing.

VII. Ranking

Each participant ranked their top three categories. The result of this vote is shown in the brackets in bold. A straw-poll was held for each of the sub-topics in the top three categories. The results are indicated in brackets after the sub-topic name (YY = strong support, Y = majority support; MIXED = approximately 50% support, N = less than 50% support).

I, II and III received the most votes.

The numbers in square brackets after the sub-topic title refer to:

- #1: number of top place votes
- #2: number of second place votes
- #3: number of third place votes

Technical Topics – Building Science

Friday, April 16, 2004

10:30 a.m. – 12:15 p.m.

Genoa Room

Building Science and Technology (name changed from Materials, Systems and Building Science)

- I. Building science**
 - Indoor air quality
 - Hypothermal performance
 - Acoustics
 - Light
 - Mechanical and structural
 - Moisture control
- II. Building technology**
 - Systems testing and approvals
 - Performance monitoring and durability
 - Systems integration
 - Innovative systems
 - Wet/service cores
 - Benchmarking between systems
- III. Materials testing and approvals**
 - Testing and certification
 - Innovative material and approval
 - Performance
 - Toxic emissions and testing
- IV. Committee volunteers**
 - Bill Farish
 - Enzo Gardin
 - Subrato Chandra
 - Jiri Sobola
 - Juan Monjo-Carrio

Concerns to check for in other sessions

- V. Design (will this be covered elsewhere, e.g. marketing?)**
 - Architectural
 - Functional
- VI. Advantages of manufactured housing**
- VII. How/if will speakers be funded or compensated?**

Appendix E—Contributing International Organizations

Table 3 Conference Contributing International Organizations

Nation	Organization web site	Representatives	Title
AUSTRALIA	CSIRO Manufacturing & Infrastructure Technology Construction Process Performance www.cmit.csiro.au	Jeff Symons	Deputy Chief of Research
	Housing Industry Association (HIA) www.buildingonline.com.au	Shane Goodwin	Chief Executive of Operations
	Lifestyle Communities Pty. Ltd. www.mylifestyle.net.au	Dael Perlov	
	Westmont Pty Ltd	Bruce Barron	Director
BRAZIL	Association of Integrated Construction Industries (ASTIC)	Helcio Hernandes	Technical Director
CANADA	Canadian Manufactured Housing Institute (CMHI) www.cmhi.ca	Kathleen Maynard	Executive Director
	National Research Council Canada (NRCC), Institute for Research in Construction (IRC) www.irc.nrc-cnrc.gc.ca	Barakat Sherif Enzo Gardin	Director General Business Development Manager
	Pontificia Universidad Católica de Chile www.ing.puc.cl	Alfredo Serpell	Professor, Department of Construction Engineering and Management
CHINA	China Architecture Design and Research Group www.cadreg.com.cn	Zongren Xu	Director of the Overseas Department
	China Institute of Building Standard Design & Research (CIBSDR)	Wang Dongsong	Director of Department of Business Plan
	China National Engineering Research Centre for Human Settlements (CNERCHS)	He Jianqing	Prof. / Deputy Director of the Department of R&D
	Chinese Housing Industry Association (CHIA) www.chinahouse.info/en	Nie Meisheng	President
CZECH REPUBLIC	Technical and Test Institute for Construction (TZUS) www.tzus.cz	Jirí Sobola	Managing Director
DENMARK	Building Materials Industry in the Confederation of Danish Industries	Christian Lerche	Director
	Danish Center for Building Information, Byggecentrum www.byggecentrum.dk	Jørn Vibe Andreasen	Managing Director
	Lean Construction - DK www.leanconstruction.dk	Pernille Walløe	Senior Consultant
EUROPE	Consortium of European Building Control (CEBC) www.cebc.co.uk	David Smith	Chairman
	European Liaison Committee for Social Housing (CECODHAS) www.cecodhas.org	Angelo Grasso	President
	European Network of Construction Companies for Research and Development (ENCORD) www.encord.org	Jesús Rodríguez	President
FRANCE	Federation Francaise du Batiment www.ffbatiment.fr	Bertrand Sablier	Chief Executive Officer
HUNGARY	National Federation of Hungarian Contractors www.evosz.hu	János Nagy	Director General
INDIA	Central Building Research Institute (CBRI) www.cbri.org	V.K. Mathur	Director

Innovation in Home Manufacturing – Common Ground: Final Report of the Planning Summit

	Construction Industry Development Council www.cidcindia.net	Shri Chander Verma	Managing Director
IRELAND	Irish Home Builders Association www.cif.ie	Hubert Fitzpatrick	Director
ISRAEL	National Building Research Institute www.technion.ac.il/~nbri	Yechiel Rosenfeld	Senior Lecturer
ITALY	QUASCO www.quasco.it	Ivan Cicconi	General Director
JAPAN	Japan Prefabricated Construction Suppliers and Manufacturers Association www.purekyo.or.jp	Yoshinori Koguchi	Chief of Public Relation's Section
LATIN AMERICA	Inter American Housing Union (UNIAPRAVI) www.uniapravi.org.pe	Carlos Corado Gerardo Gonzales	President
SINGAPORE	Building and Construction Authority	Tan Tian Chong	Director, Technology Development for Chief Executive Officer
SPAIN	Instituto de Ciencias de la Construcción Eduardo Torroja www.ietcc.csic.es	Juan Monjo-Carrió	Director
SWEDEN	BoKlok Swedish National Testing and Research Institute www.sp.se/eng Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) www.formas.se	Joakim Blomquist Carl-Johan Johansson Lisa Sennerby-Forsse	Project Manager Head of Wood Materials and Structures department Secretary-General
UNITED KINGDOM	Building Research Establishment, Ltd. (BRE) www.bre.co.uk Corus UK Ltd www.corusgroup.com	Jaya Skandamoorthy Sue Rogers David Martin	Manager of Construction Research

Appendix F—Descriptions of tours

The following two notices were distributed to Summit attendees to solicit participation in the two tours conducted in conjunction with the summit.

International Conference on Factory Built Housing

Advancing Home Building Through Industrialization

Manufactured Housing Plant Tour in Southern California Tuesday, April 13

On Tuesday, April 13 we will visit the Silvercrest manufactured home plant in Corona, California, near Los Angeles. Silvercrest's facility is the largest manufactured home plant on the US West Coast. The Corona facility's production line covers more than 5 acres under one roof and contains 28 workstations. Home sizes on the line may range from 1,000 sq ft (300 sq m) for a vacation home to over 3,000 sq ft (900 sq m) for custom homes. Together with its Corona and Woodland, California plants, Silvercrest produces approximately 2,000 homes in a typical year.

Silvercrest's Corona plant is also one of the most innovative home manufacturing facilities in the US. The high cost of land and housing in Southern California has driven Silvercrest to develop a capability to produce highly customized homes on their production line, as well as some of the most high-end manufactured homes in the US. Silvercrest was one of the first plants to manufacture two-story manufactured homes and is still one of the only plants to produce attached dwelling units using a technology platform based on the US Department of Housing and Urban Development's Manufactured Home Construction and Safety Standards. Because of the custom nature of Silvercrest's homes, they produce all of their own cabinetry and countertops in a fully equipped cabinet production facility within the plant. Silvercrest's custom homes often feature 10 feet (3 m) high volume ceilings, custom architectural features and stacked windows.

The production facility's final finish line is outside the plant and at any given time may have from 25 to 30 homes perfectly leveled for completion undergoing final touches.

Silvercrest, Western Homes Corporation is a subsidiary of Champion Enterprises, Inc., the largest manufactured housing producer in the US. Champion has 35 home building facilities located in 18 states and two Canadian Provinces and has produced more than 1.5 million homes since the company was founded. Champion Enterprises shipped over 40,000 homes in 2002.

For more information on Silvercrest, visit their website at www.silvercrest.com. The website features a virtual factory tour which will give you a small taste of what the plant visit has in store for us.



Please see the attached Tour Registration Form, if you are interested in attending this event.

International Conference on Factory Built Housing

Advancing Home Building Through Industrialization

Tour of Las Vegas Area Manufactured Housing Community Wednesday, April 14

On the afternoon of Wednesday, April 14, we will visit Mountain View Nevada, a manufactured housing community owned by Hometown America, the United State's largest operator of manufactured home communities. Mountain View Nevada is an age-qualified community for active adults who are at least 55 years old.

The Community was built in 1989 and has 360 units, all of which are manufactured homes built to the US Department of Housing and Urban Development's Manufactured Home Construction and Safety Standards (MHCSS). The MHCSS is the only national building code in the US and is the primary code to which industrialized housing in the US is constructed. All of the homes are single story "ranch" style homes, comprised of two volumetric boxes that are highly finished upon leaving the factory and are then joined at the site. They were produced by a variety of manufacturers in the southwest US.

Like most manufactured housing communities, Mountain View is a land-lease community. The residents own their homes and lease the land upon which they sit for a monthly rental fee. When residents leave, they may sell their home or move it with them to another location. Styled as a "resort" style community, Mountain View has park-like grounds and lush landscaping. Many home sites are terraced and have views of the mountains. The community offers a wide range of amenities including a pool and spa, saunas, tennis courts, a putting green and a clubhouse.

Hometown America's properties are home to more than 14,000 families, in 42 communities, located in thirteen states. Hometown America offers both all-ages and age-qualified communities. All of their communities have professional on-site management along with new home and resale brokerage services.

The tour will also stop at a manufactured home sales center where we will be able to inspect the interiors of a variety of manufactured home models and get a feel for the typical sales process.

To learn more about Hometown America visit their website at www.hometownamerica.com

The tour will depart from Caesar's Palace at 10:00am and return to the hotel at approximately 1:00pm. Please meet at the hotel concierge desk at 9:45am to board transportation.

Please see the attached Tour Registration Form, if you are interested in attending this event.



Appendix G—International Conference on Factory Built and Prefabricated Housing: Preliminary Structure

Major Goals of the Conference

- Facilitate exchange of knowledge, information and ideas across international borders – both of a technical and business nature – related to factory built/prefabricated housing
- Promote cooperation among and between housing industry enterprises across international borders

Audience for the Conference – Who should attend?

The following types of organizations are the target audiences for the International Conference:

The building community, including:

- Companies involved in the development and construction of housing that might view factory built/prefabricated housing as a viable option
- Companies involved in factory built/prefabricated housing that are interested in more efficient building methods
- Building companies interested in international markets
- Industry organizations and trade groups representing home builders and home manufacturers
- Designers, engineers, planners, and other professionals interested or involved in factory built/prefabricated housing opportunities

Suppliers to the building community, including:

- Suppliers to housing companies looking to expand markets by developing/improving the products they offer to the industrialized building industry
- Suppliers that wish to understand how their products are impacted by industrialization of the home building
- Suppliers of equipment/machinery needed in the industrialization process

Potential customers of industrialized housing, including:

- Municipalities and other government organizations that are interested in exploring factory built/prefabricated housing as a solution to their housing needs
- Social housing organizations and housing authorities interested in affordable housing solutions
- Private developers of housing that use or are interested in using factory built/prefabricated housing technologies
- Military and other government organizations that develop housing

Research community members, including:

- Universities engaged in housing education and research
- Product, material and systems testing laboratories
- Research institutes
- Government sponsors of research
- Private industry researchers

Other organizations with a stake or interest in industrialized housing, including:

- Lenders that provide financing to the industrialized housing industry
- Media organizations, including shelter publications and housing industry trade journals

Conference program and schedule

The Conference will span three full days. Three tracks of programs will run simultaneously in ten time slots series, resulting in thirty sessions, not including the general sessions. The preliminary program is shown in Table 5.

Table 4 Table 5 Preliminary Conference Program

		Track 1	Track 2	Track 3
Day 1	Series 1	Opening Plenary Session		
		Technical/business session	Building methods forum	Country presentations
	Series 2	Lunch with Keynote speaker		
		Technical/business session	Building methods forum	Country presentations
Series 3	Technical/business session	Building methods forum	Country presentations	
		General Reception		
Day 2	Series 4	Technical/business session	Building methods forum	Country presentations
	Series 5	Technical/business session	Building methods forum	Country presentations
	Lunch in exhibit area			
	Series 6	Technical/business session	Technical/business session	Country presentations
Series 7	Technical/business session	Technical/business session	Country presentations	
Day 3	Series 8	Technical/business session	Technical/business session	Country presentations
	Series 9	Technical/business session	Technical/business session	Technical/business session
	Meet the experts roundtables			
	Series 10	Technical/business session	Technical/business session	Technical/business session
		Closing Reception		

The preliminary program consists of four types of sessions shown in the draft program above:

- **General sessions** (blue). Intended for all conference attendees and held in the main reception areas. Four general sessions are anticipated as follows:
 - **Opening plenary session** – welcome by the Conference hosts and special guests
 - **Keynote speaker** (lunch) – by a presenter of international stature (such as, a representative of the World Bank discussing macro housing finance issues).
 - **“Meet the Experts”** lunch – speakers from the technical and business sessions will be asked to host round table discussions during lunch. Conference attendees may join the table of their choice to meet and talk informally with the experts.
 - **Receptions** open to all Conference attendees
- **Building method forums** (pink), 5 sessions. Each of these sessions will focus on one or more particular factory built/prefabricated building methods. One or two sessions will be devoted to each of the major structural system building methods, including: (1) wood and wood-framing; (2) concrete and masonry construction, and (3) steel and steel-based technologies. Two to four speakers in each session will describe how the technology is applied in their region and industry.
- **Country presentations** (green), 8 sessions. Each of these sessions will focus on one or more countries or regions of the world. Two to four speakers in each session will describe the state of the industrialized homebuilding industry in their country/region.

Eight sessions are presently allotted for country presentations. Preliminarily, the sessions are organized as follows:

1. Western Europe, excluding Scandinavia
 2. Scandinavia (Sweden, Denmark, Norway, Finland)
 3. North and Central America (Canada, United States, Mexico)
 4. South America
 5. Asia—Pacific North (Japan, China)
 6. Southeast Asia and India
 7. Australia and New Zealand
 8. Central and Eastern Europe, Middle East and other areas
- **Technical/business sessions** (white), 17 sessions. These sessions will cover individual topics of interest to the industrialized home building community worldwide. These topics were shaped through the discussions at the planning Summit.

Milestones

The following schedule (Table 6) lays out the key milestones for the year preceding the International Conference.

Table 5 Preliminary Schedule and Milestones

Time Frame (months prior to conference)	Milestone
12	Distribute draft program for 2005 Conference for comment by Organizing Committee
10	Distribute exhibitor information and Conference brochures
From 10 to 4	Work with Organizing Committee on dissemination of Conference materials
4	Finalize selection of presenters, including keynote speakers
1	Registration deadline
0	International Conference